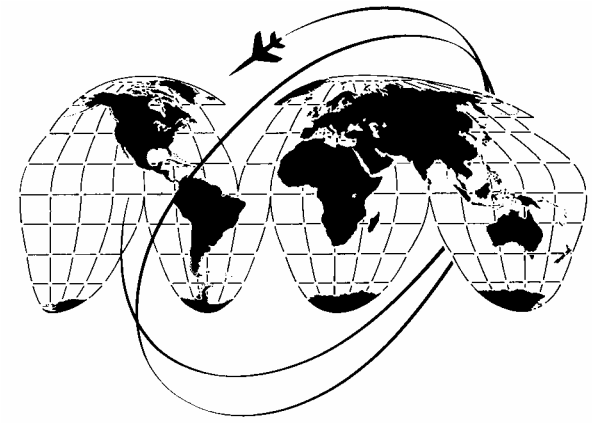
Guide for Authors

Standards for Course Development

2004

Sixteenth Edition

(Single Column Version)



Air Force Institute for Advanced Distributed Learning

Air University

Air Education and Training Command

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AFIADL Extension Course Division

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THIS 16th EDITION of the *Guide for Authors: Standards for Course Development* tells you how to prepare extension course materials for publication by the Air Force Institute for Advanced Distributed Learning (AFIADL). The subjects covered in this *Guide* range from what you do on the day you get a writing assignment to how you maintain your course after it has been printed and mailed to students.

NOTE: Because consistency of style and format is vital to communication, we must maintain a *standard* approach to presentation of USAF extension course materials. If you cannot see how to make these standards fit your course materials, talk to your AFIADL team. Your failure to adhere to these standards will be grounds for rejection of your materials.

Unit 1 tells you how to plan and manage your course and introduces you to your curriculum team. Unit 2 gives you detailed guidance on organizational patterns, text breakdowns, numbering, electronic files, hard copies, and submission requirements. Unit 3 teaches you how to write topical statements, determine proficiency codes, and write in the style recommended for an extension course. Unit 4 tells you how to use pictures to teach and helps you understand the intricacies of using digitized graphics. Unit 5 tells you how to write multiple-choice items and self-test questions and how to maintain and evaluate course examinations. Unit 6 tells you how to update a course in the field.

Appendix A gives examples of original submissions. Appendix B shows examples of supplemental submissions. Appendix C covers the method of revising by reusing existing materials. Refer to these appendixes as the *Guide* directs.

A glossary of abbreviations and acronyms used in this *Guide* is included at the back of the book.

Code numbers on figures are for preparing agency identification only.

The use of a name of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

To get an *immediate response* to your questions on guidance in this book, send E-mail to **afiadl.guide@maxwell.af.mil.** A second option is to call DSN 596–4420 or 596–4242 between 0700 and 1800 (CT), Monday through Friday. You also may fax your questions or comments to DSN 596–3208. Otherwise, write to this address: AFIADL/Extension Course Division, 50 South Turner Boulevard, Maxwell AFB, Gunter Annex AL 36118–5643.

To get copies of this book, please see your CDC manager, who may have copies readily available to you, or send E-mail to the above addresses (citing your complete mailing address, your DSN, and the number of copies you need).

NOTE: Do not use the IDEA Program to submit corrections for printing or typographical errors.

This *Guide* may be updated by issues of the *Curriculum Update*, which will be numbered with reference to the 16th edition of the *Guide*. All previous issues of the *Curriculum Update* are obsolete.

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Unit 1. Getting Started

THE AIR FORCE Institute for Advanced Distributed Learning (AFIADL), henceforth called the Institute, is a school with a global campus. Located in Alabama, the Institute serves as a part of the Air Force education and training program. Certainly, as a course author, you share in this global mission. To provide standards for our joint mission, the Institute's Education and Training Curriculum Division publishes this Guide for Authors, henceforth called the Guide. Read the Guide carefully and keep it for reference.

The Guide

The *Guide* tells you how to plan and manage your course, how to develop volumes, and how to work with your Curriculum team. Through the *Guide*, the Institute sets style and format standards. While the *Guide* addresses technical matters, it also reflects the Institute's continuous evaluation and analysis of advanced distributed learning (ADL) and adapts the best methodology to the Air Force ADL Program.

The Institute

Since you will work closely with the Institute, you need to know how you fit into the big picture. AFIADL, through its origins in the Extension Course Institute (ECI), has a long, distinguished history of producing high-quality learning materials for the Air Force. In fact, the Institute's origins are as old as those of the Air Force itself.

On becoming a separate component of the armed forces in 1947, the United States Air Force established the Extension Course Program. In 1950 the program became part of Air University (AU) and was named Extension Course Institute. ECI became one of Air University's professional specialized schools. ECI's mission was to provide voluntary, nonresident study courses for Air Force active duty and reserve forces.

In 1963 the Air Force began the dual-channel, on-the-job training (OJT) program requiring career development courses (CDC) for airman skill-level upgrade—a requirement for promotion. The Air

Force assigned responsibility for providing CDCs to support this program to ECI. In 1969 ECI assumed the added mission of providing study reference materials for the Weighted Airman Promotion System (WAPS).

In 1975 ECI became the first government institution to be accredited by the Distance Education and Training Council (DETC). DETC reaccredited ECI in 1980, 1985, 1990, 1995, and 2000. The American Council on Education (ACE) recommends college credit for many of the Institute's courses. The Institute's *Catalog and Price Listing,* henceforth called the *Catalog,* lists the amount of credit ACE recommends.

In 1977 the AU Professional Military Education (PME) Registrar functions were combined with those of ECI so that resident and nonresident record-keeping assistance for PME associate programs could be integrated. This function was given to ECI.

In 1981 ECI took responsibility for SIS-PME (Single Input System for Officer Professional Military Education). The Institute puts data directly into the military records of any officer who completes a professional course. Rapid electronic input ensures accurate records and aids in promotion and assignment consideration. In 2000 these functions, Registrar and SIS-PME, were being moved out of the Institute to be located directly under Air University as the AU Registrar in the Chief Academic Office.

In 1984 ECI began teaching a resident course in writing distance learning materials—the ECI Course for Authors. The course has been very successful in teaching course authors the practical aspects of distance learning.

In 1990 ECI moved its people and equipment from several pre–World War II buildings to one modern 120,000-square-foot facility.

In 1992 ECI created a technology branch to exploit non-paper-based instruction. Since then, the Institute has activated 14 courses incorporating computer-based instruction (CBI). Today, 43 other CDCs, specialized courses (SC), and PME courses are in the planning or development stages of production.

In 1994 ECI became part of the College of Aerospace Doctrine, Research, and Education (CADRE). In 1996 Air University reorganized, and ECI became part of the Office of Academic Support (OAS). The ECI mission did not change with either realignment of authority.

In February 2000 ECI merged with the Air Force Distance Learning Office (AFDLO) to form the Air Force Institute for Advanced Distributed Learning. Today, with a staff of civilians and military members, the Institute serves as the Air Force focal point for the implementation of Air Force ADL policy and emerging ADL technology. It also supports formal training and educational programs of the Air Force, Air National Guard, and Air Force Reserve. The Institute provides career-broadening courses to people throughout the Department of Defense (DOD) and to civil service employees in all federal agencies.

The Institute's mission and vision

The Institute's mission is to "provide force performance support capabilities to the war fighter." Our vision is "Smart warriors win. Your mind is your best weapon. Anytime, Anywhere." These tie in well with the motto of ECI for many years—Air Force Readiness through Education. That motto stemmed from a belief that educational improvement of our Air Force men and women increases their ability to support the military posture of our nation, and that military readiness requires continuing education and training of all our armed forces.

The Institute administers over 400 nonresident enlisted career development, enlisted and officer professional military education, and specialized courses for more than 160,000 students who enroll worldwide each year. Also, the Institute furnishes all study materials for mid-level grades of the

enlisted force under WAPS testing. The Institute mails nearly 100,000 packages to promotion-eligible airmen each year. The Institute is actively pursuing alternative delivery methods that include interactive CD-ROM products, electronic print-on-demand, and Internet access.

With the help of good course authors, we have been producing economical, effective distance learning materials for more than 50 years! As you can see, your role as a course author is vitally important to the Air Force.

The Institute on the Internet

Information once available only by phone during business hours is now easily available to you on our Web site. Reference works, such as the *Guide,* are available at this site. Besides good information produced by and about the Institute, you will find links to other Internet sites that may help you do your job better. Choose Writer/Manager from the menu when you visit us at our Internet site: http://www.maxwell.af.mil/au/afiadl.

1–1. Planning Your Course

To be successful in any writing or revising task, you must plan and organize. You set your goals, identify limits, and decide on basic content—follow the Air Force model for instructional systems development (ISD). While you are planning, develop a course chart, find out what source materials are available, get them, and ask for any copyright releases you need. Gather writing references and plan and request graphics as soon as you can.

Official planning document

AETC Form 469, Career Development Course Chart, identifies course content by volume and unit titles. It also lists submission dates and customer need dates for each volume.

Using existing CDC material

Before you start to organize, gather facts and ideas. First, check the resources of your own agency and those of the Institute. Our *Catalog* summarizes the course content of each of the Institute's courses. Review the *Catalog* to discover what courses might help you. The Institute's home page on the Internet will take you directly to an electronic copy of the *Catalog*.

Call authors of the courses you are interested in to verify that they have the kind and extent of materials you can use in your own course. Find out whether you need a whole course or just one or two of the volumes in it. As you identify sources, flag any that are For Official Use Only (FOUO) or that contain copyrighted material.

Getting electronic files

If you want *digital files of paper-based* CDC materials, ask the course author of the material to send them to you. Each course author is the "gatekeeper" of his or her own electronic material. The Institute does not distribute digital files of paper-based courses to anyone other than the originating course author.

Getting hard copies

To get *hard* copies of CDC volumes, E-mail your request to AFIADL/CDCMATERIAL.

Using material from other services

Other source material, including Army, Navy, Marine Corps, and Coast Guard courses, may have information you can use. Also check the libraries of local colleges, universities, and technical schools. Government publications from other agencies also may be useful to you.

Copyright releases

A government agency has no more right to use copyrighted material without permission than anyone else does. Ask the owner of the copyright *in writing* for permission to use parts of copyrighted material—text or figures. Send us a copy of each release along with a copy of your request with your manuscript. See appendix page A–4 for a sample request. Because this form is not tied to a particular Air Force specialty code (AFSC), course, base, or shop, a release granted in response to it will transfer within DOD. In your letter of transmittal, be sure to note the presence of copyrighted material.

NOTE: If you plan to change a copyrighted figure, specify the change in your request for copyright release.

Existing copyright releases

A copyright release given for use in a specific course or by a specific shop does *not* apply to all courses. Review the copyright releases for your course and renew requests for releases that have become invalid. Use the request form on appendix page A–4 of this *Guide.*

Range of borrowed material

The rules for fair use of copyrighted material are complex. You should either become an expert on Public Law 94–553, *Copyright Act of 1976,* or play it safe. How can you play it safe? If you quote from copyrighted material or use a copyrighted image (figure), get a copyright release.

Magnitude of distribution

Under the copyright law, you must consider quantity and extent of distribution. The Institute publishes volumes in great quantity and sends them around the globe—copyright releases are particularly important to us. When you ask to use copyrighted material, do *not* restrict your copyright release request to a specific course. Ask to use copyrighted material *in a training course for DOD people*. See the example on appendix page A–4. By making the release broad, you may enable another writer to use the same copyright release.

Duration of copyright

The duration of a copyright depends on many factors. Even after a copyright expires, it may be renewed. A new edition of a classic (*Huckleberry Finn,* for example) may be protected by copyright.

Second borrowers

Permission given to the first borrower does *not* extend to the second borrower. You are a second borrower when material you use from one publication was originally copyrighted in another publication. If you are a second borrower, you must get permission, just as the first borrower did. You are *not* a second borrower when a copyright owner has granted a general release of material for DOD use in training courses. In this case, you are a first borrower, no matter how many other CDCs use the material. See the sample request on appendix page A–4.

US government publications

Borrow freely from government works *unless* the part of a publication from which you borrow has copyrighted material *not already released* for use by DOD in training courses. If the material has not already been released, then you are the *second* borrower, and you must get permission from the copyright owner.

If you borrow text or figures from an existing CDC, check its acknowledgment page to see whether the material is copyrighted. If so, or if you have doubts, call the CDC writer to ask for a copy of the request and release. Send us a copy of the copyright request and the release with your letter of transmittal. Even if the release granted to a first borrower is a blanket one—in a training course for

DOD people, for government use only, or for military use only—you must send the Institute a copy of the request and release.

NOTE: Even a technical order (TO) may have copyrighted material released only for that TO.

Copyright credit lines

If you quote from copyrighted sources, prepare an acknowledgment page (and a bibliography if the copyright release requires it). See the sample acknowledgment page on appendix page A–5 and the sample bibliography on appendix page A–11. Copyright lenders may specify the format of acknowledgments or credit lines; set up your credits as they ask. In the letter of transmittal, say whether you have used copyrighted material.

Internal copyright credit

Keep credits in the body of the text (not in footnotes). For example, "The following passage is quoted by permission from…" or "Permission granted…" For borrowed figures, put the credit line in parentheses following the figure legend. Even if you are reusing text or a figure from the previous edition of the book, send us a copy of the copyright request and release.

Copyright law information

See AFI 51–303, *Intellectual Property—Patents, Patent Related Matters, Trademarks, and Copyrights;* 17 USC 107; and *General Guide to the Copyright Act of 1976,* published by the US Copyright Office, Library of Congress, and you can consult your local staff judge advocate (SJA) office.

Also see http://www.maxwell.af.mil/au/afiadl. Choose Writer/Manager from the menu. Then choose IMI Guide. Then choose Unit 4, "Copyright Law."

Checklist for Using Copyrighted Material

1) Get a copyright release if
   a) you quote from copyrighted material.
   b) your paraphrase of copyrighted material serves as a main source.
   c) you borrow a copyrighted figure.
2) When requesting permission to use copyrighted material
   a) tell the copyright owner DOD people will use the material.
   b) do not mention the course by number or name.
   c) use the appropriate format for your request (appendix page A–4).
   d) contact your SJA before you agree to pay a fee or purchase a license for copyrighted material.
3) When quoting from copyrighted sources
   a) use the appropriate format for the acknowledgment page (appendix page A–5).
   b) list copyrighted figures in the acknowledgment.
   c) give credit to sources within the text. Say, "Permission granted...."
   d) list copyrighted sources in the bibliography (if required).
   e) place figure credit lines in parentheses following the figure.
4) State in your letter of transmittal whether you have used copyrighted material.
5) Send one copy of each request and release to use copyrighted material to the Institute, and send one set to your local SJA office.

Be sensitive, but not hypersensitive, to your legal obligations concerning copyrighted text. After you make clear that a section, or the material under a boldface head, or whatever, is adapted from a given work, you text. After you make clear that a section, or the material under a boldface head, or whatever, is adapted from a given work, you do not have to keep referring to that work.

(After you identify your source, whether you need to make a follow-up reference depends partly on the length of the piece of text and partly on whether you splice in material *not* based on the source.)

Reasonable is the key word. Follow the stipulations in your copyright release (your use of the material implies your agreement to the terms of the release), and give your readers a *reasonable* chance to know the source of your information. Having done this, you have fulfilled your obligations to the copyright holder. Use the checklist at the bottom of this page when you use copyrighted material.

Trademark symbols

You need not use a trademark symbol unless the intellectual property owner specifically requests its use. But the first time you use a trademark, write out the entire name; e.g., Microsoft Windows.

Reference material

You should have a recent dictionary, a good English grammar text, and handbooks on writing and technical writing. We recommend the *Chicago Manual of Style*. We ask you to use the same government reference works we use. Besides this *Guide*, we use mainly the *Air University Style Guide*. A link to the style guide is on the Internet at this address: http://www.maxwell.af.mil/

Other valuable references are:

- AFI 33–360, volume 1, *Publications Management Program.*
- JP 1–02, *Department of Defense Dictionary of Military and Associated Terms.*

You can link to Air Force publications and forms at this Internet address: http://afpubs.hq.af.mil/

You can link to the dictionary at this Internet address: http://www.dtic.mil/doctrine/jel/doddict

Graphics

Graphics shops cannot do their best work unless they have time. Collect draft illustrations and request graphics support as early as you can, but don't complete your illustrations until you have a very good idea of where your volume is going. Make notes of ideas for illustrations while you develop the course outline.

As you plan figures, including forms and letters, do not use joke names and titles for people, bases, or office designations. Also, do not use the names of real people without their written permission.

Equations and formulas

Create equations and formulas using the Equation Editor feature of Microsoft Word for Windows. Put equations and formulas in the units and test item pool exactly as you want them printed.

Course length

As a course increases in size, course failures and noncompletions rise. Course size is reflected in the number of volumes *and* in the length of individual volumes in a course.

Consider volume length

Generally, a volume should have about 200 pages (100 sheets). Upper and lower limits are 300 pages (150 sheets) and 100 pages (50 sheets). In your computation of your volume's page count, include an estimate of pages added by figures and unit review exercise (URE) items.

Make the first volume short

Try not to make the first volume too difficult or long. Instead, try to capture the student's interest and provide a basis for more difficult volumes to follow. Completing a short first volume gives a student a feeling of accomplishment to inspire further study.

Revise shorter

Do not *just add* new information; delete unneeded text. Look for areas to teach through pictures instead of words.

Leave out subjects your specialty gets elsewhere (from PME courses, and annual refresher training, such as operations security (OPSEC), communications security (COMSEC), and computer security (COMPUSEC). If your specialty training standard (STS) requires you to address any of these subjects, cover them only as they relate to your career field.

Consider dividing long volumes

You can handle material you cannot cover adequately in 300 printed pages in two ways. The *best* way to divide long texts is to put the material into two or more volumes and to assign individual volume numbers. For example, suppose you cannot cover the topic you planned for volume 3 in 300 printed pages. The title you had planned for volume 3 is *Electric Current Units.* Divide the material you had intended to put into volume 3 into two separately numbered volumes: volume 3, *Direct Current Units,* and volume 4, *Alternating Current Units.*

An alternate way is to divide a long volume into A and B volumes. This is less desirable than giving each volume its own number, but it is *possible* when necessary. For example, you may use this way if you are revising any volume except the last one in an existing CDC. If you divide volume 1 into two parts, number the first part *volume 1A* and the second part *volume 1B.* Give the same title to volume A and volume B. Adjust any cross-references within the two new volumes or between them and any other volume.

NOTE: When you divide volume 1 into parts A and B, divide the lesson numbers *evenly:*

- Volume 1A—lessons 001 through 099.
- Volume 1B—lessons 101 through 199.

Consider dividing long courses

Why should you divide a long course?

- To enhance student performance.
- To get a course in the field fast.

Enhance student performance

The best size of a course is the size that optimizes student performance. Here we will repeat ourselves for emphasis: The Institute's research shows that, as a course increases in size, course failures and noncompletions rise.

Split for speed

Let's review the obvious: It takes longer to get a long course in the field than it takes to get a short course in the field. Why? Students receive the whole course at one time, not a volume at a time, and the more volumes there are in a course, the longer the production time.

One way to get updated training to the field quickly is to split a course having several volumes into A and B courses. You prepare and send the volumes for the A course to the Institute first. We review, edit, publish, and activate it. Students enroll in A as a prerequisite to B, which you write and we publish by the time students finish A.

As an added benefit, splitting a course permits more comprehensive UREs and course examinations (CE). You can have 124 items for *each* of the A and B courses rather than 124 items for *all* the material. When and where should you divide a long course?

If a course has seven or more volumes, *consider* dividing it into two or more shorter courses. In career field mergers, CDCs often are combined into a new CDC with a course number relating to the new AFSC number. The new course may be so long that it overwhelms the students.

The solution may be to divide the course. For instance, a CDC writer divided CDC 3E351 into two courses: 3E351A and 3E351B. The A course is a prerequisite to the B course, and the numbering of the volumes in each course starts with volume 1. The tables here show how the writer divided this 11-volume course into a 7-volume course and a 4-volume course.

CDC 3E351A	
Vol #	**Lesson #**
1	001–199
2	201–399
3	401–599
4	601–799
5	801–999
6	A01–A99
7	B01–B99

CDC 3E351B	
Vol #	**Lesson #**
1	001–199
2	201–399
3	401–599
4	601–799

The writer separated the volumes based on a logical division of subject matter. The A course is still longer than we recommend, but the total effect of the division was a huge improvement.

Format

Make your working outline with reference to the Institute's format. The table above shows the main elements of the format.

Format Elements	
Unit	Self-contained body of knowledge within a volume. *Must have an introduction*.
Section	Grouping of related lessons in a unit. *Must have an introduction*.
Topical Statement	A condensed objective heading at the start of a lesson.
Lesson	Text under a numbered topical statement.
Headings	Words given special typeface attributes and placed before a block of text to show lesson organization. Headings may be boldface, boldface italic, or italic, depending on the heading level. Headings are organizational "signposts" for students.
Menu	Listing of section heads and topical statements.
Self-Test Questions (STQ)	Short answer, problem/situation, and matching questions based on information in a section. STQs are presented in the same sequence in which they are supported in the text. They appear at the end of each section.
Answers To STQs	Brief responses at the end of a unit to answer STQs.
Unit Review Exercise (URE)	An open-book teaching exercise made up of multiple-choice questions to sample the information in a unit. Like STQs, they are presented in the same sequence in which they are supported in the text. A URE is printed at the end of each unit. (A URE answer key is published separately.)
Figures (Fig)	Illustrations—tables, line art, or photographs. Editors at the Institute place figures as close as possible to the text the figure clarifies.
Foldouts (FO)	Figures too large to fit on a single page in a lesson. The Institute places foldouts for each CDC volume (even when a volume has only one foldout) in a separate supplementary material volume. This change is essential to the success of our print-on-demand initiative.

Blended learning development

Once you know the kind and extent of the material you need to teach, start choosing the best way to teach it. A computer may be a better teaching device than a printed book for some of your materials.

Interactive multimedia instruction (IMI) lets students interact with the computer to "see" or "experience" information (engine repair, for instance) that print-based teaching could only ask them to visualize. This interaction greatly enhances student comprehension and retention of information. Audio, video, models/mockups, and print are less interactive.

The Institute uses the term *multimedia enhancement* for the inclusion of computer-delivered IMI, audio, video, or models/mock-ups together with a print-based CDC. Normally, multimedia enhancement is put on a CD-ROM and mailed to the student with the paper part of the CDC.

Before you choose any type of multimedia enhancement, you must understand clearly the technology options available to you, along with each option's strengths and challenges. Since IMI is more time-consuming and costly to design and develop than print-based instruction, reserve IMI for teaching *complex* concepts, procedures, maintenance, or troubleshooting. Traditional media, such as audio and video, can further enhance IMI. Printed medium is well suited for much of the 5- and 7-level self-study training materials. Choose print where processes or operations change frequently and for general descriptions, functions, roles, and responsibilities.

Print also should be your choice when getting updated information into the hands of your students is critical.

Before you choose multimedia enhancement for your CDC or specialized course, talk it over with the Curriculum Division Blended Learning Team, who can advise you and point you toward some good references (DSN 596-2001).

In-depth guidance on full IMI and multimedia enhancement is available on the AFIADL home page, http://www.maxwell.af.mil/au/afiadl, under the tab Writer/Manager, IMI Guide, and Media Enhancement Guide.

1–2. Managing Your Course

As you can see, your job as a CDC writer involves more than writing new materials. You must also evaluate, refine, and revise existing instruction. In fact, this is what you will do most often.

Posting changes

The time you spend posting changes to a master text as the changes surface can save much more time later when you prepare an errata change, a change supplement, or a revision. Immediate posting:

- Keeps you from exhausting searches for misplaced notes.
- Protects you from the hazards of poor memory.
- Provides a better basis for discussing strategies with your team.
- Ensures continuity for the next writer.

Using updating strategies

Though we offer no absolute rules on how to select a strategy, here is a general approach.

Step 1

Develop the right attitude. Ask, "What is the *very least* I can do to make this course current?" Of course, don't cut corners or be less than 100 percent conscientious.

Step 2

Consider each volume separately. Even though you have a new STS, chances are that not all volumes need revising. For those that do, only parts of them may need work. So, before you act, find out exactly what your workload is.

NOTE: If your course has a new number, you cannot revise one volume under the new number and leave another volume under the old number. You must revise the "good" volumes, too, even if your "revision" is no more than new front matter. If your revision is limited to front matter and a few isolated areas in the book, (1) tell your team to alert the branch chief and (2) say so in your letter of transmittal. If you keep us from processing an entire book, or most of one, that is in good shape, we have more time to spend on your new materials. If necessary, call AFIADL (DSN 596–4420 or 596-4242) for guidance.

Step 3

Apply strategy criteria. When you know the extent of the revision, you are ready to apply the Institute's strategy. The table on the next page lists general criteria for deciding which strategy to use. For more detailed information, see the discussion in unit 6 of this *Guide.*

Step 4

Call your Curriculum team as early as possible in the updating process. Give them your E-mail address for ease of communication. Let your team members help you fine-tune your strategy. The table on the next page summarizes this discussion.

Strategy 1. No change	Volume is working as it is. There are only a few minor typos or errors.
Strategy 2. Shipping list change	Only pen-and-ink changes are needed. You can make deletions, changes, or minor additions. Shipping list changes for an entire course should not exceed six typed pages. Students can post all changes in an hour or less.
Strategy 3. Supplement	Includes page replacements, as well as deletions, changes, or minor additions. No more than 40 percent of material may be changed. Students can post all changes in an hour or less.
Strategy 4. Revise using electronically archived material	Reuse existing electronic materials to build a new volume from the same or other courses, or to incorporate supplements and errata when they exceed 40 percent of course material. See appendix C for step-by-step procedures.
Strategy 5. Rewrite	More than 40 percent of material must be changed because of new STS requirements, or because you must incorporate supplemental changes or other materials that are not available in electronic media.

1–3. Working with Your Curriculum Team

Work closely with your Curriculum team (made up of instructional systems specialists (ISS) and editors) throughout your project—from planning to final coordination. Your team can advise you on creation and revision strategies, effective educational schemes, submission requirements, and format. Together with your Curriculum team, you should be able to produce a high-quality course for your students. Anytime you have questions about your course materials, call or E-mail your team. Your team either knows the answer or can put you in touch with someone who does.

NOTE: Here's an answer to one of your questions: you can get *templates* and instructions on how to use them from the AFIADL website.

E-mail

Include your personal E-mail address in *any* correspondence. E-mail addresses for your team are on the inside back cover of this *Guide.* Get set up early for connectivity with the Institute.

AFIADL recommends that your office establish a stable E-mail address that students and your course development team can use to contact you or your successors.

The instructional systems specialist

An ISS reviews your work in detail for effective educational presentation and clear communication. Consulting with you as necessary, the ISS rewrites to improve text, organization, exercise coverage, and format, as well as to ensure internal consistency. The ISS also carefully examines your test items for adherence to format requirements and to assure the text provides one, and only one, correct answer.

Before the review and rewrite start

When an ISS starts on your volume, you should get a call or E-mail telling you the status of your project and setting up a coordination method.

Typically, we coordinate unit-by-unit using E-mail. The ISS should explain the suspense on your project so that you will know what to expect. The ISS may also ask you to send more multiple-choice questions. The ISS must reserve several questions for the CE and still have enough for comprehensive coverage in the URE.

NOTE: Be sure to give your E-mail address in the letter of transmittal.

During the review and rewrite

Your ISS will call or E-mail you to clarify points and perhaps to ask you to send more self-test questions or corrected figures. Please respond to these requests quickly. When you get a unit file, call or E-mail your ISS with any corrections. *It is imperative that you make all improvements now. At the page proof stage, you will be allowed to correct only actual subject matter inaccuracies.*

After the review and rewrite

Once you have coordinated on each unit, your ISS makes the final changes. The ISS then gives the volume to the branch chief for assignment to an editor for copy editing and desktop layout.

The editor

Your editor may have a few questions about your wording preferences, table setup, and so forth. Please respond as quickly as you can. When you have resolved all text questions and have corrected any faulty graphics, the editor creates the final page layout. This is a detailed process requiring meticulous care. The editor must be part artist, part mathematician, part printing technician, and part computer whiz to get the graphics placed at the best place.

Once the editor has worked some editorial magic, you will get a page proof so that you can coordinate corrections to any factual errors with the assigned ISS. *This is not the time to make arbitrary changes*.

Manuscript evaluation

Using the Summary of Manuscript Review (previously ECI Form 68), your ISS evaluates each volume. This summary evaluation gives you, your supervisor, and your CDC manager comments about the initial quality of the volume and explains what the ISS and editor did to improve the volume.

The ISS and editor also recommend things to be done at the next revision. Sometimes, because of time and resource limitations, neither you nor we can do *everything* needed to a volume to make it teach the way we'd like for it to.

The Summary of Manuscript Review also is documentation for future course authors and ISSs who will revise the volume. Before you start work on a course, look in your continuity file for past Summaries of Manuscript Review. The summary gives you good information about what work has been done on a volume and what work remains to be done.

When you get a Summary of Manuscript Review, put it in your continuity file for reference in the next revision. At some AETC bases, having these Summaries of Manuscript Review on file is an inspection item.

You can see that this summary form is extremely important both for informational and documentation reasons—yours and ours. *The form is not for personnel performance appraisals.* Rather, it is a tool for continuous improvement of your and our processes and products.

1–4. Setting Up Connectivity

Throughout this unit, you've seen references to electronic connectivity as a means of fast, efficient communications. You may wonder whether you have access to this important tool.

Basically, if you have a modem (or LAN access) and Internet access, you can send and receive E-mail. E-mail is controlled locally by your organization. We use E-mail to coordinate with you.

CDSAR (Course Development and Student Administration/Registrar) access is another matter—it's FOUO—and you'll need a password. *First* go to your base education officer to arrange all these connectivity matters. If there are issues the education officer cannot handle, E-mail us at databranch@maxwell.af.mil or call us at DSN 596–5344.

Summary

By now, you know you are responsible for the content, including currency and technical accuracy, of the courses you write and maintain. The Institute helps you by evaluating and analyzing your courseware and by adapting the best distance learning methodologies to the program. To get started with a course project, you must plan carefully. Then, you must gather source material, use appropriate references, get graphics support, and get copyright releases. Whether you are writing a new course from scratch or revising an existing course, you must manage it strategically. Your Curriculum team members are here to help you with these tasks. Call them.

Unit 2. Preparing Your Course

PREPARING your course for publication takes up where planning left off. Study this unit carefully—it gives you tips on organizational patterns, explains the logic of our numbering system, prescribes the contents of document (DOC) files, identifies required hard copy, and tells you how to send your project.

2–1. Selecting Organizational Patterns

Your final product reflects the quality of your first organizational efforts. You can write from a well-organized outline more easily and quickly than from a poorly organized one. Spend extra time organizing and you save time overall. More importantly, you write a better course.

An extended discussion is easier to follow if it has a clear pattern. Yet, you'll rarely use only one pattern; you'll mix two or more—space and time, for example. Many subjects seem to choose their own patterns. Most discussions of the first few seconds of an atomic bomb explosion fall into the time pattern, but discussions of bomb damage fall into cause and effect or division presentation. Always pick a pattern (or combination) that presents your ideas clearly. Here, you can learn about several useful patterns.

Go from the simple to the complex

Compare the next two paragraphs as "teachers." The first paragraph hurries into the subject and may leave students behind. The second leads students into the subject carefully, moving from easy to hard ideas. If you use the second method, students can absorb simple ideas before you throw tough ones at them.

> Geophone patterns can be complex. Star and cross patterns are used for different structures, the latter being especially useful for steep-dip structures.
>
> Since geophone patterns are complex, and since different patterns are used for different purposes, let's start with the simplest. A geophone pattern is a regular grouping of "jugs" on the ground. The simplest grouping is the straight line, usually consisting of a straight line of geophones across the hole.

Go from the known to the unknown

This organizational pattern is much like the one just discussed; here, though, you start with what your students know and build discussions on that base. One way to use this device is to relate job situations students may have experienced to the new material you are teaching.

Other organizational patterns

Review this table when you start to organize.

Other Organizational Patterns	
Pattern	**Description**
Cause and effect	Use this pattern to point out why an event took place, the effect of one event on another, or the relationships of a chain of events.
Contrast and comparison	Use this pattern to distinguish between two similar items or events. Use it to point out how things that seem alike are different and how things that seem different are alike.
Definition	Often, you simply want the student to define a term. To define a term, first put it into its class and then tell how it differs from others of its class.
Division	When a lesson requires the student to demonstrate an understanding of a total operation, an outline that presents the operation in a step-by-step way is useful, especially if the operation or procedure is long.
Space	If space, location, or geographical arrangement is an important feature of the item being discussed, and if one of those features is required knowledge for the student, use the spatial approach in developing the outline and lessons.
Time	Often, the most important aspect of an event happens at a specified time, or perhaps the sequence of happenings before or after the event is of the greatest importance.
Topical	This may be the most common presentation pattern in technical writing. Use it to treat closely related topics separately. With this pattern, as with others, use parallel structure in your headings. Parallel structure helps point up the relationship of the topics.

2–2. Using Standard Text Breakdowns

To help students organize their thoughts, organize *your* thoughts and show the organization through titles and headings. These titles and headings are your *outline*, an extremely useful tool. It should be easy enough to make because you already know in considerable detail what you must include in your course. Here, in a nutshell, is how you make one:

Begin by knowing that *you* get to choose the order in which your material is presented. Your Specialty Training Standard (STS) tells you what to cover and to what extent to cover it. Your STS does *not* mandate the order of presentation—unless they tell you specifically otherwise, your U&TW and other authorities trust you to find the best way to communicate the information.

Your own experience and understanding of the material tell you which pieces of material a student needs to know first, which second, etc. Now break the material up into large chunks that stick together (volumes). Break the volumes into smaller chunks that stick together (units). Break the units into even smaller chunks that stick together (sections). Continue through lessons, boldface headings, etc., and soon enough you will have arrived at a working plan for presenting the material.

Remember that your outline is a *working plan.* You are likely to find that some of the pieces of your outline want to shift around as you get into the actual writing. Let them shift! Change your outline any time you find a better approach to something than you had originally conceived. (**NOTE**: Each title and heading must be followed by text before you present another title or heading.) If you cannot provide general information or words of introduction to the discussions that follow, re-examine your outline. If your outline looks sound, research your subject further.

Major organizational elements

Courses are divided into volumes, volumes into units, units into sections, sections into lessons, and lessons into headings. Ideally, a volume has from two to six units; a unit from two to eight sections. A section should be no longer than a student can study in one study session.

The course title, unit titles, section titles, topical statements, and other headings must *not repeat* one another. (The format for volume, unit, and section titles is to capitalize the first letter of each major word.) If, in planning a volume, you produce an outline for the first unit like the one below, you need to refine the organization.

Volume Title: Ignition Systems
Unit 5. The Ignition System
5–1. The Ignition System
635. The ignition system

After analyzing the information again, you may refine the standard text breakdowns. The outline on page 2–5 shows the refined organization down to the boldface heading level. A unit written on the second outline is easier to follow—the headings give cues to the logic of the material. The first outline does not break down the unit title; it repeats it. Divide your text as far as logic requires. If you break down a piece of text, break it into at least two pieces:

- A course *may* have only one volume but generally has at least two.
- A volume should have at least two units.
- A unit should have at least two sections.
- A section should have at least two lessons.

If your material does not fit in the breakdowns given here, talk with your team. For instance, if a unit doesn't lend itself to two sections, ask your team whether to omit the section heading or to make some other adjustment, such as combining the unit with another one.

Note the logic of the heading levels, which correspond to styles in the Word templates. In Word, to see and revise your outline, switch to Outline view.

To see all headings down to the italic level without the accompanying text, select Show Heading 6 on the Outline toolbar that pops up in this view. To leave the Outline view, select Normal or Page Layout view.

Note also that a proficiency code is included for each topical statement. Type the code in *hidden text* just after, but on the same line as, each topical statement. (Press Ctrl+Shift+H, type the code, and press Ctrl+Shift+H to turn off the hidden font.) To see the codes, click the Show/Hide button (¶) on the Standard toolbar.

Organization below the section level

Sections are broken into lessons (topical statements: heading level 3), lessons into boldface divisions (heading level 4), boldface divisions into boldface italic divisions (heading level 5), and boldface italic divisions into italic divisions (heading level 6). Generally, you do not break down text past the italic level. You can see a summary of headings in the table here.

Unit title	Heading 1
Section title	Heading 2
Topical statement (lesson title)	Heading 3
Boldface heading	Heading 4
Boldface italic heading	Heading 5
Italic heading	Heading 6

Topical statements or lesson headings (heading level 3)

A topical statement is an abbreviated behavioral objective that appears before each lesson. Please read how to write good topical statements in unit 3 of this *Guide*.

The topical statement goes on a line just before the lesson text. Use heading level 3. Capitalize the first letter of the first word, and lowercase other words unless they are proper nouns. Use *no* end punctuation unless the topical statement asks a question.

A topic important enough to need a section heading usually has enough text to need *at least two* lessons. Analyze any section having only one lesson. If the lesson is long, you may need to break it into two or more lessons. If you have a short one-lesson section, go back to the overall plan to see whether you can combine sections.

Boldface headings (heading level 4)

The first heading within a lesson is boldface. *There should be at least two boldface headings if there are any.* If you cannot break a lesson into at least two parts, do *not* use a boldface heading in that lesson. A boldface heading goes on a separate line just before the related text. Use heading level 4. Capitalize the first letter of the first word, and lowercase the other words unless they are proper nouns. Use *no* end punctuation unless the heading asks a question.

Volume Title: Ignition Systems
Unit 5. The J–5 Ignition System **Heading Level 1**
5–1. System Description **Heading Level 2**
635. How the vibrator works B **Heading Level 3**
Components **Heading Level 4**
Functions
Operations
636. How the transformer works B
Components
Functions
Operations
637. How the rectifier works B
Components
Functions
Operations
5–2. System Maintenance
638. Checking out the system B
Getting started
Documenting findings
639. Making minor repairs B
Getting the right manual
Using the best tools

Boldface italic headings (heading level 5)

Further breakdowns into boldface italic headings are allowed but not required. Just as you must not have a single boldface heading in a lesson, neither may you have a single boldface italic heading.

Put the boldface italic heading on a separate line just before the related text. Use heading level 5. Capitalize the first letter of the first word, and lowercase the other words unless they are proper nouns. Use *no* end punctuation unless the heading asks a question.

Italic headings (heading level 6)

You may break down discussions further and use italic headings as organizational markers. Again, though, do *not* have a single italic heading.

Put the italic heading on a separate line just before the related text. Use heading level 6. Capitalize the first letter of the first word, and lowercase the other words unless they are proper nouns. Use *no* end punctuation unless the heading asks a question.

Numbered and lettered lists

Though you *may* use numbers and letters to show text breakdowns below the italic level, normally numbers are *only for lists*, not for paragraphs. If you find yourself using numbers or letters for paragraphs, look again at the lesson's organization. Probably, the numbered or lettered paragraphs should be paragraphs with italic or boldface italic headings.

Bullets

Bullets are *not* subordination devices. They are tools for emphasis and advance organizers. See unit 3 for a full discussion on how you can use bullets to stress important information.

Notes

To include notes, format the entry like this:

NOTE: Use bold, all caps for the word **"NOTE,"** and then use regular text, uppercase and lowercase, for the note itself.

Cautions and warnings

To emphasize cautions, warnings, or safety issues, format the entry in a boxed statement, without shading, like this—

CAUTION: Use bold, all caps for the word **"CAUTION,"** and then use regular text, uppercase and lowercase, for the note itself. Put a box around the caution statement.

2–3. Numbering

Materials you send for publication must conform to our numbering guidelines. Be especially careful to number precisely in sequence.

Volume number and lesson identification system

Number volumes consecutively throughout the course, starting with volume 1. Do so even when you divide a long course into two or more courses. Make the first volume of each course *volume 1*.

Number lessons in three digits with a range for five volumes of 001 to 999. For courses that exceed five volumes, use letters *and* numbers. Lesson numbers are assigned to specific volumes:

Volume	Lessons
1	001–199
2	201–399
3	401–599
4	601–799
5	801–999
6	A01–A99 B01–B99
7	C01–C99 D01–D99

To divide long volumes into parts A and B, use this numbering system:

Volume	Lessons
1A	001–099
1B	101–199
2A	201–299
2B	301–399

Unit numbers

Number units consecutively in each volume. Always start with unit 1.

Section numbers

Give sections dual numbers, and start numbering anew in each unit. The first part of the dual number is the unit number, and the second part is the sequence number of the section within the unit.

Unit 1. The J–5 Ignition System
1–1. System Description
1–2. System Maintenance

Unit 2. The Saturn VB Ignition System
2–1. System Description
2–2. System Maintenance

Lesson numbers

Number lessons (or topical statements) consecutively throughout each volume. The specific numbers assigned to each volume are listed in the tables on this page.

Self-test question and answer numbers

Reference the self-test questions by topical statement and number. Sequence questions in the same order that the supporting text appears in the lessons. Arrange and number self-test questions according to appendix page A–8.

Reference the answers for the self-test questions by topical statement number only. Do *not* put a period after the topical statement number. See appendix page A–8.

Figure numbers

Accurate numbering of figures is crucial. As a final step before you send your materials, check the numbering of all your figures. For technical information on graphics, see unit 4. For how to name graphics files, see section 4–2.

Dual-number identification

Except for cover art and foldouts, give figures *dual* numbers: the first part of the dual number is the unit number, and the second part is the sequence number for the figure.

Tables

Tables may be graphics or typed into the text.

Tables as graphics

Number these tables *consecutively*—in sequence with figures. Do not set up a separate numbering sequence for tables. Tables are figures if you send them as graphics. Send as a graphic *any* table you cannot format successfully in Word.

Tables typed into the text

If you type a table for immediate reference, do *not* number the table. If you refer to the table in other areas of the text, number the table in sequence with the other unit graphics, *as a figure* (even though the table remains in the Word file).

To number or not to number a table

This decision table should help you to decide whether to use a figure designation for a table.

If table is	Then
Typed into text and you refer to it once	Do not assign a figure number.
Typed into text and you refer to it in more than one location	Assign a figure number (in sequence with other unit figures).
Sent as a graphic	

STQ, URE, CE, and answer figures

Number all figures in each unit *in sequence*, including self-test question and answer figures. Number any figures you wish to use in UREs or CEs as T–1, T–2, and so forth (see appendix page A–12), and refer to them as such in your proposed multiple-choice test questions. When your ISS selects items to use in the volume and items to save for the course examination, an editor will assign proper numbers to the URE figures so that they, too, will be numbered in sequence with the other figures in each unit. When the ISS develops the examinations for the course, the ISS will see that the figures are referenced properly in the examination questions.

Foldouts

Number foldouts consecutively in the order in which you refer to them in *each* volume. Use single numbers and make a separate legend list. See appendix page A–12.

2–4. Sending Electronic Files

How should you send electronic files and which electronic files should you send? When you send your volume manuscript and graphics, *mail* them to this address:

AFIADL/ECOC
50 South Turner Boulevard
Maxwell AFB, Gunter Annex AL 36118–5643

For the details of packaging and mailing, see section 2–6 on page 2–16. Follow the instructions given there "to the letter."

Check each disk you send for viruses just before you send it. Also label each disk with:

- Your name, office symbol, and DSN.
- CDC and volume numbers.
- A list of the disk contents.
- The classification of the disk contents—FOUO or unclassified.
- Notice of copyright if disk has copyrighted material.

Required files

With each package you send to the Institute, you must include certain electronic files:

- U0.DOC for multiple-choice items for the UREs and course examinations.
- FRONT.DOC for front matter.
- U1.DOC, U2.DOC, etc., for units.
- GLOS.DOC to define acronyms, abbreviations, and special terms.
- F1–01.JPG, F1–01.GIF, etc., for any graphics.
- LEG.DOC when you must show appendix and foldout numbers and legends.

U0.DOC

Send your multiple-choice item pool in this file. Unit 5 explains the details.

FRONT.DOC

This file contains the front and inside front covers, the preface, and the table of contents. Create this file last—the table of contents is compiled automatically from existing units. If you have not created the units, the table of contents cannot be compiled properly.

When only unclassified information is in a volume, use the basic front matter template to develop the front matter. When FOUO material is in a volume, use the special FOUO front matter template to develop it. This special template inserts the required FOUO notice. For guidance on FOUO, refer to DOD 5400.7–R/Air Force Supplement, *DOD Freedom of Information Act Program.*

Preface

The templates include the standard statements for the preface, but you must give an *overview* of the volume. Say concisely what the volume covers: that is, tell about as much as the unit titles and section headings do. In volume 1 of a multivolume course, also say what the *course* covers: that is, tell how many more volumes there are and then, volume by volume, tell about as much as the volume titles and unit titles do.

Then, give *special notes.* Explain where foldouts are and identify extra materials, such as glossaries, appendixes, and so forth.

Volume contents

If you create the FRONT.DOC last, the table of contents for the volume is generated automatically by a field code in the template.

U1.DOC, U2.DOC, and so forth

These files have the text of the units. Please refer to appendix pages A–6 through A–8 for examples. Send hard copies only for pages having very complex material—extensive cuts, complicated formulas or equations, and so forth—that you could not do in Word.

If your volume is FOUO, "For Official Use Only" must be printed at the foot of every unit page. The Institute's applicable Word templates include a toolbar button for installing this footer.

Heading levels and outlines

Because using Word for Windows heading levels in your units allows us to generate an outline *automatically,* do not send a separate outline. For this automatic feature to work, though, you *must* use the heading level styles in our templates. Please look at the table below for information on viewing outlines and heading levels.

NOTE: In Outline view, you can move entire paragraphs or groups of paragraphs easily. You can reorganize text while you look at the "big picture." How? Select the heading for the discussion you want to move and then drag it to a *new* outline location. The text under the heading moves with it.

Viewing and printing an outline	Using the heading feature in Word enables you to view and print an outline without creating a separate file. To see the outline at any time, click on View, Outline. Then, on the Outline toolbar, select the outline level you wish to view—probably level 6, because clicking on level 6 shows headings down to the italic level.
Assigning proper heading levels	To use the heading feature properly, give unit titles, section titles, lesson numbers and topical statements, and headings within lessons appropriate heading styles. Put each alone on a line before the block of text it defines.
Identifying proficiency codes	To identify proficiency codes on your "automatic" outline, use hidden text to type in the code at the end of each topical statement on the same line as the statement. When you have the Show/Hide button (¶) depressed, your topical statement should look something like this: **601. How to use hidden text to identify proficiency codes** A ¶

Use short, clear titles and headings

A title should state without ambiguity what is in the text it seeks to define. If possible, make the title interesting; a short, peppy title is better than a long, involved one. Titles and headings should not repeat one another.

Punctuation in titles and headings

Do *not* use end punctuation after titles or headings *except* when a title or heading is stated in the form of a question.

Capitalization in titles and headings

Capitalize the first letter of each major word in course, volume, unit, and section titles. Do not capitalize minor words, such as *a*, *an*, *the*, and short prepositions. In topical statements and headings, capitalize only the first letter of the first word and the first letter of each proper noun in the heading. AFI 33–360, volume 1, *Publications Management Program*, gives detailed guidance.

Capitalization in the text

The modern tendency is to use as few capital letters as possible. A guiding principle is to *avoid* capitalizing anytime you are in doubt. The Institute must abide by the capitalization rules in the *AU Style Guide*. Thus, it is extremely important for you to start the writing process by using this same guide. To see the *AU Style Guide* entry on capitalization, go to the Air University home page and follow the links to the AU Press.

The Institute is the *final* authority on capitalization. When you get your page proof, text and glossary capitalization may be different from what you sent us. Our editors are applying the rules of the *AU Style Guide* to make sure your course conforms to correct capitalization conventions.

Abbreviations and acronyms in the text

Use abbreviations and acronyms sparingly. Do not saturate writing with abbreviations and acronyms to the detriment of reader understanding.

Do not use acronyms or abbreviations in unit titles, section headings, or topical statements unless using the spelled-out words would make the title or heading so long and cumbersome as to impede comprehension. Clarity is the touchstone: “When in doubt, spell it out.”

The same considerations apply to text breakdowns below topical statement level. At these levels, you also may use acronyms and abbreviations that are so common that they communicate to everyone: USAF, DOD, CDC, etc.

You *may* begin or end a sentence with an abbreviation or acronym.

Spell out the name of an agency, organization, term, phrase, and so forth, the first time you use it, and follow it with the acronym or abbreviation in parentheses. You may use the acronym or abbreviation (without periods) thereafter. For more details and examples, see the *AU Style Guide* entry under “abbreviations and acronyms.” It is not necessary to spell out a term and include its parenthetical abbreviation or acronym in each unit of a volume. Do not capitalize the spelled-out term for an abbreviation or acronym unless the term is a proper noun. Do not make an abbreviation or acronym plural or possessive on its first use.

Spell out each acronym and abbreviation on first text use in each volume. Also spell out each acronym and abbreviation the *first* time it is used in *each* U0 item.

NOTE: Enter and identify each acronym and abbreviation in the glossary.

Titles of forms and service publications

Short titles, such as DD Form 200 or AFH 33–337, save space and time, but they do not reveal the nature of the form or the content of the publication. For your students' sake, the first time you mention a form or a publication, give the identifying number and the complete title (for example, DD Form 200, Financial Liability Investigation of Property Loss; AFH 33–337, *The Tongue and Quill*). Note that the form title *is not* italicized but the publication title *is*. You may give a title more than once if needed.

Figure placement

Type each figure legend just below the paragraph that has the first reference to the figure. Leave one blank line above the legend. We will place figures with the legends. (See the example on appendix page A–7.) Insert a credit line for each copyrighted graphic in your text files. Unless your copyright release requires otherwise, follow this example: Figure 3–1. Clearing the airway. (Reprinted by permission.)

Lists

To make lists, first select numbers, then letters, and then lowercase roman numerals for the list elements, as shown here:

1. First level of list. **Indent .25" from left**
2. Still first level of list.
    a) Second level of list. **Indent .5" from left**
    b) Still second level of list.
        i) Third level of list. **Indent .75" from left**
        ii) Still third level of list.

Subscripts and superscripts

Make text and figures consistent in the use of subscripts and superscripts to show values and name components. We cannot verify these subject matter elements. Use the subscript and superscript fonts available in Word.

For standards on subscripting values (E_1, C_1, V_{BB}, etc.) we must rely on you—the subject matter expert—to send us text that is "subbed," "supered," or "on the line," according to the conventions of your career field—electronics, chemistry, and so forth. The Institute will accept your usage, *if you are consistent within each volume.* Unfortunately, we often get manuscripts in which such elements appear various ways in the text and still another way in the graphics. Obviously, such inconsistencies within the same volume are unacceptable both from publishing and from educational standpoints. Double-check your work. Make sure text and graphics agree!

Self-test questions

Enter self-test questions after each section. Group questions by lesson number and topical statement. Apply the self-test question learning objective (STQLO) style to the topical statement here. The questions themselves should have the STQs style, unless they are matching questions.

For matching self-test questions, use the special custom toolbar to apply appropriate styles. To get this special toolbar, click on View, Toolbars, and select it.

Answers to self-test questions

Place answers at the end of each unit. Group answers by lesson number. Do not use a period after lesson numbers. Apply the STQLO style to the lesson numbers. The answers themselves should have the Answers or Subordinate Answer style.

Do *not* repeat the question in the answer. Use simple phrases to give answers—complete sentences are not needed. For example, a self-test question that asks for the capital of Alabama would have for its answer "Montgomery," not "The capital of Alabama is Montgomery."

GLOS.DOC

With *each* CDC volume you send, send one or both of these types of glossaries:

- Abbreviations, acronyms, and initials.
- Technical terms.

The first type of glossary is required with each volume. Send the second type as needed. Keep the two types of glossaries *separate* within the GLOS.DOC file. (See the example on appendix page A–10.)

A published glossary can be particularly helpful to students if your career field uses uncommon definitions for common abbreviations, acronyms, or technical terms. Glossaries are essential to the ISS and editor who work on your course. Type all terms in lower case, unless they are proper nouns, so that the ISS and editor will know how to treat them in the text.

Do not include lesson numbers as study references with glossary entries. Do not include publications and forms as glossary entries.

Do not use glossaries to support more than one volume unless you can verify all entries against all volumes you will send. Our production procedures do not let us hold completed volumes to read them against a glossary. Course glossaries do not add credit hours or points.

Glossary of abbreviations

Send a glossary with each volume that has *any* abbreviations and acronyms. Of course, you don't include such common abbreviations as "qt" and "lb," acronyms such as "radar," and initials such as "CDC."

Because the *Guide for Authors* is directed toward a more diverse readership than is your course, the *Guide* glossary contains some of these entries.

The *AU Style Guide* prescribes Joint Pub 1–02, *Department of Defense Dictionary of Military and Associated Terms*, as the source for abbreviations and acronyms. For abbreviations and acronyms, lowercase each word in the spelled-out term unless the word is a proper noun.

Glossary of technical terms

If any terms you use are technical and new to the students, a glossary will be helpful. Even though you define the new terms in the text when you first use them, a glossary offers an advantage—it gives students a list of key words that they can review without having to scan the text.

F1–01.EPS, F1–01.JPG, and so forth

Which graphics files to send and how to name them are frequent course author questions.

Which graphics files must you send?

The answer is simple: *all* of them. Send a new electronic copy of *each figure* each time you send a volume. *The Institute does not and cannot archive graphics.*

Include a separate file for each graphic, and send a coordination hard copy made from the electronic file. Except for photographs, we will *not* accept graphics that we must paste up manually. Unit 4 discusses graphics in detail.

WARNING: Do not insert graphics into unit files. Doing so causes significant problems for our editors in desktop layout. Send graphics files *separately*. Our editors will put them in the right place at the right time.

What are all those numbers?

Graphics for our courses carry two types of numeric identification:

- Graphics shop number.
- CDC figure number.

Graphics shop ID number	Graphics shops use numbers to identify graphics they prepare. They put a unique identification number directly on each graphic, in small type, at the bottom of the graphic (fig. 2–1). The number on the graphic refers to the graphics shop's filing system. To organize thousands of graphics, graphics shops must devise numbering systems to make finding and copying graphics files easy for them. *Your* ease of handling and *our* need to identify graphics by file names describing what is in the files are *not* considerations in a graphics shop's numbering system.
CDC figure number	A figure number helps a student find a picture. It appears under each figure just before the name of the figure, and you use it in the text to refer to the figure. It is also a numeric reference to tell us where to insert which figure. Figure numbers are dual numbers. The first number identifies the unit; the second number identifies the figure's sequence within the unit. The graphics shop should *not* put figure numbers or figure titles directly on graphics. You insert legends into unit files to identify the graphics by number and name. You also identify graphics by figure number on coordination hard copies.

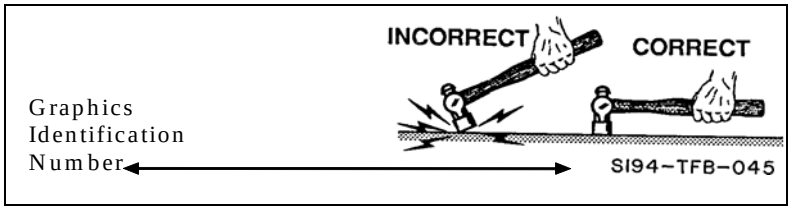


Figure 2–1. How to use a ball-peen hammer.

CDC figure number

File-naming conventions

Electronic file names should duplicate figure numbers. The file name of each graphic should include the dual figure number *and* a file name extension identifying the graphics file format. If the file format of figure 2–1 is Graphics Interchange Format (GIF), the file name must include this information: F2–01.GIF.

You *may* include *more* information in the file name. You may name your files for volume 1 as V1F1–01.GIF, and so forth, and for volume 2 as V2F1–01.GIF, and so forth. Including volume numbers may help avoid confusion from volume to volume. What we *must* have are the figure number (F1–01) in the file name and the format type (GIF) in the file name extension.

If you are sure which figure numbers will go with graphics *before* you do a graphics work order, you may be able to get the graphics shop to assign file names to correspond with figure numbers. If not, you must rename files with the proper figure numbers after you have organized your material and decided on figure sequence.

LEG.DOC

In this file, include legends for appendixes and foldouts. (A "legend" identifies an appendix or a foldout; for example, "Foldout 1. Ordnance devices.") Group legends for *appendixes* and *foldouts* separately. (See appendix page A–12.)

- Enter all appendix legends and then all foldout legends.
- Do *not* use blank lines to separate legends.
- Sequence the legends for foldouts in the order you refer to them in the volume.
- List any sublegends just below the legend.
- In legends for forms, include the word "sample." Do *not* send *blank* forms to us as illustrations (unit 4)—fill in the form with hypothetical entries.

Other files

Include in your package electronic files for any of these documents relevant to the volume you are sending:

- ACK.DOC.
- APPEN.DOC.
- BIB.DOC.
- README.DOC.

ACK.DOC

The Word template for front matter leads you through preparation of all front matter elements *except* for acknowledgments. Create this file to identify those who granted permission for you to use copyrighted material. Do not use this file to thank people who helped you.

APPEN.DOC

Set up extensive material, such as charts, tables, and extracts from TOs and other government publications, as appendixes. (See appendix page A–9.) If your reference material is too bulky to be bound in the back of your volume, call your team to discuss having it bound separately.

BIB.DOC

A bibliography is *optional* unless a copyright release requires a bibliography for a copyrighted work. Do *not* include Air Force publications. Use a bibliography to list commercial texts, periodicals, and other publications the students can consult for more information. Since our courses are self-contained, you seldom need a bibliography. *Do not send one unless you want your students to consult the sources listed or a copyright release requires one.* (See the BIB.DOC file example on appendix page A–11.)

README.DOC

This file is optional. Include it only to give information to the Institute's staff that we may need before we start work on your project.

2–5. Sending Hard Copies

Besides electronic files, you must send several other things to get your volumes published. Here, we identify these items.

Illustrations

Send coordination copies of figures and foldouts.

Coordination copies of figures

Send a coordination hard copy for each graphic. On the hard copy, lower right-hand corner, write the course, volume, and figure number. We do *not* ask for a *camera-ready copy*.

Foldouts

Send print-quality (camera-ready) foldouts. On the front, lower right-hand corner, 1 inch from any part of the foldout that is to be printed, write (in blue pencil) the foldout number, course, and volume number. Send only *one* set of foldouts.

Administrative materials

Include in your package these documents:

- Letter of transmittal.
- Checklist for shipping course material.
- Copyright release (when needed).

Letter of transmittal

In the letter (appendix page A–2), identify the following:

Yourself

Give your name, DSN number, and E-mail address.

NOTE: AFIADL recommends that your office establish a stable E-mail address that students and your course development team can use to contact you or your successors.

FOUO information in the volume or supplemental material

See DOD 5400.7–R/Air Force Supplement, *DOD Freedom of Information Act Program.*

Common volumes

Say whether the volume is common to a volume in another course. A volume to be used in two or more courses is a common volume. If you are planning a text to be used in at least two courses (whether in production or already printed), call your team to discuss how to send the materials.

NOTE: The common volume process is *much* easier if you make the common volume have the same volume number for each course.

Borrowed text

Identify the exact source of material you reuse. If you borrowed a section or more of text exactly from any CDC (including the previous edition of the one you are revising), cite the source. Correlate borrowed text to its source by unit, section, and lesson number. When you borrow from a CDC, call the writer of the material to find out whether corrections and improvements have been made for the next revision.

Forms and publications

You can find current and obsolete Air Force forms and publications at http://www.e-publishing.af.mil/. All other military forms and publications are found at their respective service sites.

Copyrighted material

State whether the volume has copyrighted material.

Request to use color

If there's something you cannot teach without using color, send justification. (See page 4–15.)

Checklist for shipping course material

Use a checklist so that you'll have everything in your package that you need to send to the Institute. See the sample on appendix page A–3.

Copyright requests and releases

Attach a copy of each copyright request and release to your letter of transmittal. Send us a copy of each copyright request and release when you use copyrighted material, no matter how often the same material has been used in CDCs before. See the sample requesting permission to use copyrighted material on appendix page A–4.

2–6. Mailing Materials

When you have *all* of your materials together, pack and mail your project to us. The rules here apply to all courses except cryptologic CDCs.

Packaging

Protect camera-ready material. Pack course materials in containers strong enough to protect them in transit. Wrap packages to meet Air Force and postal specifications.

Mailing

Use first-class mail, United Parcel Service (UPS), or the Base Information Transfer System (BITS). Check local requirements. *Electronic file transfer is reserved for later coordination with your ISS.* Send *all* CDC materials (volumes, changes, and supplements) to the following address:

AFIADL/ECOC
50 South Turner Boulevard
Maxwell AFB, Gunter Annex AL 36118–5643

Keeping your volume moving

As we log in your course materials, we check to be sure they are complete and are prepared properly. If your package is missing something, it goes "on hold" (with downtime charged to you). The Institute cannot accept responsibility for not meeting a need date when we don't receive a *complete* package early enough to process it.

We put your materials on hold *only if we must.* We correct minor deficiencies if we can; other times, materials are so deficient that we must get you to make corrections. This table is a checklist of areas that most often lead to our putting your package on hold and calling on you for remedial action. Check your project to make sure you are clear in these areas.

Preparation Checklist	
	Missing graphics.
	Graphics our equipment can't read.
	Missing topicid in the U0.DOC file.
	Missing self-test questions and answers.
	Missing hidden TEST markers in units.
	Graphics not matching hard copy.
	Graphics files not named as figure numbers. (The graphics shop identification number, or whatever, doesn't tell the editor which graphic to insert into the text file.)
	More self-test questions than answers, or vice versa. (If this problem is not widespread, we try to solve it by phone.)

Preparation Checklist	
	Misnumbering so widespread or so crazy that we can't figure out how to renumber, can't figure out whether materials are in the right order, etc.
	Fewer than two multiple-choice items per lesson or fewer than 75 items per volume.

2–7. Sending Changed Material after You've Sent Your Project

Sometimes, you must send changes to materials already at the Institute. These instances involve changes to equipment, procedures, and so forth, mandated *after* you sent in the project. Your prompt attention to such a circumstance may let you get the changes in your CDC volumes rather than into an "activation" supplement—a supplement sent with your course when it is activated. When you must change material already here, how you proceed depends on *where* your volume is in the production cycle.

Before an ISS begins work on a volume

If your volume is "doing shelf time," follow these steps:

1. Call your branch chief at the Institute right away so that he or she can adjust assignment of projects if need be.
2. Notify the Curriculum Control Branch (AFIADL/ECOC, DSN 596–4258) to expect new materials for input, if the volume has not yet reached Course Development Branch A or B.
3. Prepare your changes very carefully.
4. For text updates and corrections, insert changes into the unit. Mail a new unit file and tell us to replace the old unit with the new one. Do *not* prepare inserts for the Institute.
5. For corrected graphics, send new graphics files, named properly, and hard copies of the new graphics, labeled properly.
6. Send a letter of transmittal explaining exactly how to use the new material.
7. Mail the package to your branch chief or AFIADL/ECOC, as appropriate.

While an ISS or editor is working on a volume

If your volume is in production for educational review and rewrite or for editing, tell your ISS about the changes you need to make and discuss what to do. Together, you will decide on the best way for you to send changes (E-mail or regular mail), to whom you must address the corrections, and the best way for the Institute to incorporate the material.

After a volume has been processed

When a volume has been reviewed, rewritten as needed, and edited, but the volume has not been printed, you and the branch chief together can decide whether the changes can and should be made to the book before course activation. If your discussion with the branch chief reveals that you cannot send your changes in time for us to rework your project to meet the field need date, you must send a change supplement.

2–8. Coordinating Electronically with Your ISS

It is the Institute's procedure to coordinate with course authors unit by unit when possible. The most practical way to coordinate is to exchange digital files by E-mail. Ask your local CDC

manager and your local systems people how to attach and download Word files in E-mail messages. If you have questions about the Institute's part in file exchange, please talk to your team. If you do not have E-mail, we can coordinate by mailing disks.

2–9. Keeping Electronic Files of CDC Text

When the editor sends you electronic copies of your volume files by E-mail, keep *only* those files. These files reflect both the ISS's and the editor's work on your volume. They reflect final layout.

Which files do you get for archiving?

Keep these electronic files of your CDC volumes—FRONT.DOC, U#.DOCs, GLOS.DOC, APPEN.DOC, U0.DOC, and BIB.DOC (when a bibliography is required).

Again, keep *only* the edited files you get at the page-proof stage. Do *not* keep the original files you sent to the Institute, and do *not* keep the files your ISS sent you unit by unit for coordination. Keeping multiple electronic copies of your CDC can cause big trouble.

Explanation of how files pass back and forth between you and the Institute

If you understand the first three paragraphs of this section, you may disregard the rest of this section. If you do *not* understand the first three paragraphs, this brief review of how files pass back and forth between writers and the Institute should clarify things.

You send original manuscript text to the Institute in electronic files *on disk.* An ISS reviews and rewrites or revises each volume to improve it, as needed, for educational effectiveness, clarity, currency, style, and so on.

The ISS uses E-mail to coordinate with you unit by unit. These coordination files are an *interim* product.

You must do your intensive review of your ISS's efforts at the coordination stage. We accept *only* corrections of actual subject matter inaccuracies at the page proof stage.

After you coordinate with your ISS on these files and reach agreement on changes, an editorial assistant (your editor) takes over the project at the Institute. The editor reads the text carefully for grammar, punctuation, internal consistency, and so on. Editorial changes should not affect meaning, and, generally, there is no need to coordinate with you on these matters. If there is a need, the editor or ISS either phones you to work out the details or E-mails the files to you for your review.

When the editorial process is complete, the editor links graphics to your unit files and completes the final layout. The editor then makes an electronic page proof and sends it to you and to your ISS. ***Overwrite*** *all your original and coordination files with these edited files* (FRONT.DOC, U#.DOCs, U0.DOC, APPEN.DOC, GLOS.DOC, BIB.DOC.). **These are the last electronic files you will get for the volume.**

If you find errors in the page proof, phone your ISS to work out corrections. Obviously, you do not make *changes* at this point—only *corrections*. Make only those corrections that would otherwise necessitate a shipping list change. The time to have made changes was during the unit-by-unit coordination with your ISS, much earlier in the process.

Once you have corrected your copy of the edited electronic files, they should correspond exactly with the text the Institute sends to the printer. Use only these edited files for revising or supplementing.

Summary

This unit covered a number of very important factors in preparing your course materials. First, we discussed the crucial step of organizing your material. Your success as a course writer depends on your careful attention to this element. Plan your book carefully and your task will become much easier. After discussing organization, we covered our standard numbering system. Then, we introduced file names for the various parts of your book and explained what should be in each file. We also listed the hard copies we need with each volume. Finally, we explained packaging, mailing, and coordination requirements.

Unit 3. Choosing Your Words

ONE ON ONE—that’s the relationship you have with your students! They depend on what *you* write and the illustrations *you* use. Only *you* can translate broad, technical jargon into easy-to-understand, student-centered, instructional language. The result of your teaching efforts will be that your students absorb more information and retain it in a logical, usable way. Word choice comes into play in two critical areas: writing topical statements that control lesson content and developing lesson text that supports the topical statements.

3–1. Writing Topical Statements

Topical statements are *condensed objective headings.* When you write topical statements, you are writing *nonbehavioral* lesson objectives. Topical statements identify the desired level of learning or proficiency you want your students to display—just like any objective statement.

All the topical statements for an entire unit appear in the unit menu on the first page of the unit. As an indicator or a guide to students, each topical statement appears at the beginning of its corresponding lesson. Also, as a prompt to students, each topical statement appears before its associated self-test questions at the end of each section.

Your goal as a course author is to write topical statements that reveal both the *topic* students should gain knowledge of and the *learning level* they should achieve.

More specifically, you need to write topical statements that relate directly to a particular STS element and to the assigned proficiency code level.

In this section, you will learn how topical statements control the *content* of the lessons you write for them. This section also explains how you can select a statement style suitable for the proficiency level your student should reach after studying the lesson.

Reflect the specialty training standard

CDCs give students the career knowledge listed and coded in the current STS. As you write topical statements, keep in mind the proficiency code that is assigned to the subject matter. Never forget that each *topical statement* is an *objective* that leads students to mastery of the *knowledge* behind the corresponding STS item. Of course, students develop *skill* while working on the job—not while studying your CDC.

Interpret proficiency codes literally

Interpret proficiency codes in the STS literally and let the wording of the code steer the wording of the topical statement. *Codes A, B, a, b, and c are generally suited for use in CDCs.* No distinction is made in topical statements among behavioral verbs (state, cite, specify, identify, describe, and so forth) to show level of student response. Yet, the level of the proficiency code should *steer* (not dictate) the wording of the topical statement.

Sequence topical statements

A course requires decisions about the sequencing of objectives. The goal of good instruction is to establish sequences within the course that promote effective learning. The sequence and lessons within your volume should be based on the prerequisite relationship among the topical statements. Lessons should show a logical progression of the STS elements for text development. The most obvious sequence follows the order from simple to complex or from general to specific.

Control content and level of response

Topical statements control both lesson content and student level of response. In other words, the level of the proficiency code that is assigned to the topical statement is the same level at which you will develop your test items.

If the topic is coded with uppercase “A” or lowercase “a,” you want your students just to be able to recall or recognize previously learned material (facts, theories, parts, tools, etc.), basically in the same form as taught.

A topic that is coded with an uppercase “B” or lowercase “b” should be written to teach the student to identify relationships, concepts, or procedures beyond the simple remembering of material and parts.

At the lowercase “c” level, you go beyond simple recall and attempt to establish relationships between tasks in order to form operating principles. In addition to teaching the procedures, you teach why and when a step is needed or a task is done.

Select a statement style

When you write topical statements, you may find the tips in the discussion below of uppercase and lowercase codes of some use in selecting your statement style. For more guidance on using proficiency codes as you write topical statements, study the proficiency code-to-topical statement decision table in this section.

Decision Table			
Code	**Description**	**Focus**	**Topical Statement**
a	nomenclature	facts, tools, parts	noun
A	facts	facts, terms	noun
b	procedures	procedures	how to, gerund
B	principles	general principles relationship of facts	question, noun
c	operating principles	why and when of tasks why step is needed may involve what student or system does	gerund, question, noun

Lowercase codes

Lowercase proficiency codes relate to *task* knowledge. A topical statement for a lesson on task knowledge can begin with a gerund (*ing* forms of verbs used as nouns) or a "how to" statement, such as, how to do something, how to make something, or how to plan something. The following examples are usually applied to lowercase use:

001. Replacing a flat tire

002. How to trace routes on a map

"How to" statements don't *always* indicate steps. For example, the lesson for this topical statement may cover only factors to consider, such as drill pitch, hardness, and so on:

310. How to select a drill bit

Uppercase codes

Uppercase codes have to do with *subject* knowledge. A topical statement for a lesson on subject knowledge likely will be stated as a title (noun) or as a question. In uppercase use (not exclusively), apply questions such as these: What is the purpose of…? What is the definition of…? What are the four steps of…? Nouns can also be applied in both lowercase and uppercase settings—for example, safety principles, levels of authority, program objectives, concepts, historical facts, and policies. Here are some examples:

003. Types of alarm conditions

004. What safety principles apply to your workplace?

Identify the proficiency code

Immediately after each topical statement, type the related proficiency code. Use *hidden* text for this.

NOTE: To include the proficiency code in hidden text, you can use the drop-down menu system or keyboard shortcuts.

1. To use the menu, click on Format and Font, and, under Effects, select Hidden before you type the proficiency code. To see hidden text, click the Show/Hide button (¶) on the standard toolbar. After you type each proficiency code, use the same drop-down menu to deselect the hidden font.

2. To use keyboard shortcuts, press Ctrl+Shift+H. Then, type in the proficiency code, and press Ctrl+Shift+H again to turn off the hidden font. To make sure you have typed the hidden text correctly, click the Show/Hide button (¶).

In Word, you can see a text outline showing topical statements and *corresponding proficiency codes.* Click on View, Outline, and select the Show Heading 6 button from the special outline toolbar. To print your outline (including hidden text), click on Tools, Options, and select the Print tab. Under Include with Document, select Hidden Text. *Deselect this printing option before you return to regular document printing.*

Progressing in training and codes

Progression in training from one level to another does *not* automatically require elevating proficiency codes. The progression may be training *in a new aspect* of a task, training that should be directed to the same proficiency shown for the task at the previous level. In short, the same code can be entered for two levels.

3–2. Putting a Teacher in the Text

The most effective teachers approach students in several ways:

- Use attention-getting introductions.
- Include only essential lesson text.
- Give details and examples.
- Use simple language.
- Put students in the job.
- Emphasize key information.

Use attention-getting introductions

The Institute's format *requires* unit *and* section introductions. In introductions you can:

- Direct students' attention to the theme of the unit or section.
- Create advance organizers for the information students must learn.

Introductions carry part of your teaching load. Use them to motivate and inspire students to study. Preview the lesson material, but do more than give a laundry list. Give a reason for the unit or section information and its organization.

Do not present substantial information in introductions unless you expand on the information in the lessons. Self-test questions, unit review exercises, and course examinations test students only on information *in the lessons,* not on information in the introductions.

As you write, think of yourself as a teacher standing on a written platform. You must work hard to gain and keep student interest. Effective introductions are key tools in this effort.

Include only essential lesson text

Be guided by your topical statements, and remember that the CDC charter is to teach specialty-specific information the student needs to satisfy the career knowledge track of dual-channel on-the-job training.

This kind of information includes principles, techniques, procedures, and their application to systems and situations common to your specialty.

Give students information they need to complete the self-test questions and unit review exercises. Anything that does not contribute to student achievement of lesson objectives (topical statements) does not belong in the text. Avoid nice-to-know information.

Guidance on appropriate content

Security, supervision, training, communication, safety, and certain contingency procedures normally do *not* belong in a CDC. Here's an easy test of appropriateness:

> Is this material general Air Force knowledge or Air Force specialty knowledge?

If the answer is "general Air Force knowledge," do *not* include the material in the CDC. If the answer is "Air Force specialty knowledge," *do* include it in the CDC. If your course training standard (CTS) includes generalized items, try one of these procedures: (1) submit an STS change asking that the item be dropped; (2) code the item on the CTS for non-inclusion. Work with your career field manager.

Do not needlessly repeat information

Repetition of material within a course, or from a prerequisite to a course, must be limited to summaries to introduce a further treatment of the material. Obviously, you must not duplicate large portions of text in your 5- and 7-level courses.

Do not duplicate objectives of other training programs

When PME or ancillary training gives the knowledge for a particular STS item, document such programs on the STS to show that the CDC will not duplicate information given in other USAF training programs.

Include the specific type and title of training that satisfies the STS requirement. Write topical statements only to address Air Force specialty knowledge.

Give details and examples

Whether students are reading your course or sitting in a classroom, they must have details and examples to understand the subject and apply the knowledge. How well students accept concepts you present depends on the strength of your support material. Keep it simple, accurate, timely, and relevant. Be very careful to give current information.

Make your examples appropriate, brief, and interesting. Sometimes, you can present them in groups of two or three for emphasis and reinforcement. Of course, keep all examples in good taste, and do not use the name of a real person or a base in a negative way.

Giving facts without showing *how to apply* them can leave students groping desperately for the very relationships you want them to know. Suppose you are writing a course for airmen beginning training in Air Force oil geophysics. You begin by writing this:

> Place the shot below the weathering so that the ground roll will not affect recording of the reflection.

A student reading the sentence must ask questions: What is weathering? How does weathering relate to recording? What is ground roll? What is shot? You would do better to write:

> Weathering roughly corresponds to the layer of earth between the surface and the groundwater table. Below this table the rocks are saturated with water. The slow earth waves that move horizontally through the weathering interfere with, and often obliterate, the faster earth waves that we are trying to record.

Here, you define a term a beginner would not know and anticipate a question. You eliminate a term, *ground roll,* that you do not need and that might be confusing. If your course is directed

toward more experienced people, as in a 7-level course, you could use the first version. Experienced people would know the terms and the problem you describe. To sum up: Never—well, hardly ever—let a generalization go unsupported; use details and examples.

Watch lesson length

We do not stipulate maximum and minimum size limits for lessons because the material drives lesson size. As a rule of thumb, though, good lessons seldom exceed four printed pages. Yet, any lesson that will not print out as at least one page is suspect. You do not want choppy lessons—develop ideas fully and do not divide material *unnecessarily*.

Does a lesson teach through an illustration? A complicated illustration that the student must study in detail suggests that the text should be relatively short if possible. An illustration that serves only to identify an item of equipment probably should not influence lesson size.

Also consider whether the material is closely packed with information. If it is, make the lesson relatively short, if possible. Short lessons on densely packed information help us include more of the important information on UREs and CEs. Generally, a URE or a CE has a fairly even scattering of items from all lessons. You can see how dividing lessons promotes even coverage.

Use simple language

AFIADL does not compute reading grade levels. We stress a "plain English" standard. A plain, clear style communicates better than any other does. For help in the principles of writing, see AFH 33–337, *The Tongue and Quill.* To find an electronic version of the *AU Style Guide for Writers and Editors*, go to www.maxwell.af.mil and look under Air University Press.

The use of two or more terms to mean the same thing is confusing to the student. Before writing the text, identify and list one technical term to be used for each component, tool, and procedure to be discussed in the text; and use only that one term throughout the course. If reusing text, double-check it to be sure terminology is consistent with your list of technical terms to be used.

Words

Use words students understand. Short, familiar words do a better job than big words. Why use *ultimate* when you mean *last* or *the majority* when you mean *most?* The table here is a good starting point.

Sentences

As you write each sentence, remember your purpose—teaching. Consider sentence length and structure as you teach.

Purpose

You do much of your writing to convert regulations and TOs into instructional text. You have a different purpose than did the writer of your source material. You are not copying or even translating the other writer's work. You are *changing* the way the material is presented. You are *teaching*. Easy readability is key to getting your point across to your students. The only measure of readability is clarity. A short, simple sentence is clearer than a long, complex sentence.

Structure

Just as you should use plain words, you should use plain sentences. Most basic writing classes teach word order. Subject-verb-object (SVO) is the simplest and often the best sentence structure. Using this structure helps you write direct, clear sentences.

Length

Give your sentences impact. Keep them short. Aim for an average *maximum* of 14 to 17 words.

Paragraphs

Short paragraphs help the look of the page and give the students a breather. A good paragraph is 10 to 15 lines. (Use a short one—like this one—only when there is no more to say; and use a long one only when breaking it impedes communication.) Avoid one-sentence paragraphs.

Instead of this	Try this
accomplish	do, complete, carry out
additional	More
adjacent to	next to
approximately	About
assist	Help
attempt	Try
close proximity	Near
contain	Have
demonstrate	Show
echelon	Level
final	Last
forward	Send
fundamental	Basic
however	But
in accordance with	by, under
indicate	Show
in order to	To
in the event that	If
locate	Find
notify	Tell
observe	see, watch
perform	Do
permit	Let
personnel	People
prior to	Before
provide	Give
purchase	Buy
request	Ask
utilize	Use

Transitions

Transitions help your students follow your train of thought. The best transitions are implied. Sometimes, though, you need some "signposts" or "thought bridges." For instance, to add ideas, use such words as *again, also, besides,* or *moreover.* To contrast ideas, use such words as *but, yet, still,* or *instead.*

To show time, use *next, then,* or *meanwhile*. Of course, you can use any other words that will make clear to your students exactly how one idea follows another.

Put students "in the job"

Set up a realistic teaching situation and then address your students directly when you discuss tasks. Even when you present general information, explain principles, or discuss theories, remember you are writing for your students—real people. Why not address your students in terms of the job they are or will be doing?

Use active, direct language

Write procedures using active verbs. Active verbs make your prose powerful and memorable. Your students will learn procedures better when you use active verbs. Passive verbs tend to make writing weak and even hard to understand. Consider the two sentences here telling a driver about a task.

Passive	The fuel should be checked each morning.
Active	Check the fuel level each morning.

With the passive construction, there is no way for the student to know who should check the fuel level each morning. Even if the passive construction tells who does it, the writing gets indirect and wordy.

Passive with doer identified but "hidden"	The fuel should be checked each morning *by the driver.*
Active	Check the fuel level each morning.

The active voice is clear. It's simple. It's bold. It's direct. It makes the subject easy to learn.

Here's another example of procedural instructions that may or may not apply to the student:

Once the popping pressure is adjusted and the relief valve is closed, the adjusting screw is locked in place with the safety nut.

If your students must do the adjusting, talk to the student directly:

> First, adjust the popping pressure and close the relief valve. Then, lock the adjusting screw in place with the safety nut.

Make the student the center of emphasis

Putting the student in the job involves more than writing in the active voice. It affects your whole approach to your subject. Always keep the purpose of your writing in mind: teaching your students. Your purpose in writing each lesson is the same as your purpose when you teach a trainee a lesson *on the job.*

When students must be able to do a task, make them the center of the action. When their role is secondary, make their responsibilities clear. When material you give students is merely background information, tell them so.

Emphasize key information

Use lists, bullets, graphics, and other attention-getting devices to make sure students get the key points. Discuss one point at a time. State essential information clearly; then, go to the next point. (Graphics are covered in unit 4.)

List main ideas

Sometimes, you can break up a long passage of solid text by making a list of the main ideas. A list gives some white space on the page and helps students to pick out important ideas. But don't overdo listing. Most lists should have no more than seven elements, and seldom should two lists be on the same printed page. The amount of information students retain is inversely proportional to the length of the list and to the nearness of other lists.

Use bullets

Bullets are tools for emphasis. To flag a few short statements or to announce topics you plan to discuss in a lesson, use bullets. They stand out clearly from the rest of the text. They can isolate and emphasize important points. Note the use of bullets as you read through the *Guide.* Like exclamation points, bullets are effective only if you use them sparingly.

Bullets are *not* organizational devices. To show subordination, use headings. To enumerate items in a list, use numbers.

Bullets stress short statements of important points

Use bullets only to accentuate short statements (no more than four lines, preferably fewer). Do not bullet entire paragraphs. Paragraphs require headings (boldface, boldface italic, or italic), not bullets.

Bullets give students a preview of coming attractions

Use bullets to highlight a few short expressions that serve as advance organizers for topics you will discuss.

Bullets are for occasional use

Bullets lose their ability to highlight and isolate text if you use them often. *Do not* use bullets for a simple list or to show subordination.

The Institute makes final decisions on format

Once you have made the best decisions you can about how to organize text breakdowns, the Institute's ISSs review every element carefully and completely to enhance educational effectiveness. Editors then examine each manuscript for format, making sure every text element is consistent with the prescribed format. For example, if bullets precede paragraphs, the editor corrects the format inconsistency. At the Institute, we try to communicate to you, the course author, the best way to present text; but ultimately, the Institute is responsible for format choices.

Summary

Easy writing makes hard reading. Hard writing makes easy reading. Be hard on yourself—devote the time and effort needed to express yourself clearly and fully. Do not let your misuse of the language be a stumbling block for your students.

Unit 4. Choosing Your Pictures

NOWHERE IS THE saying, "A picture is worth a thousand words," more appropriate than in our business. Just as a lecturer uses charts and slides, you use figures to support your discussions. Rarely can you explain complicated electrical circuitry without schematics. A student who might struggle for hours over a discussion of electrical circuitry can grasp the same information from a clear figure after a few minutes. A figure can be a substitute for detailed explanations.

Figures also break up text and relieve the monotony of column after column of text. Part of your job as a writer is to learn when to use figures and what forms the figures should take. To decide what your graphics needs are, ask these questions:

- What can I do to make my figures *teach?*
- What types of figures can I use, and when should I use them?

You probably can think of many ways to use figures to improve your teaching. Besides schematics and wiring diagrams, you can use figures as completed examples or as exercises for the student to complete. Tables and charts, whether presented as numbered figures or simply keyed into a unit file, can present some kinds of information much more efficiently than a paragraph format can. You can use a line drawing of a piece of equipment and then use an exploded view or cutaway drawing of its subelements to call attention to detail. Or you can use a cartoon to make your point humorously.

NOTE: By *figures* we mean cover art, illustrations, line drawings, charts, completed forms, tables sent as graphics, and foldouts. By *artwork* we mean anything that cannot be done in Microsoft Word. Do not ask the Institute to do artwork. Get your graphics shop to do it.

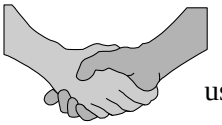
4–1. Using Figures to Teach

You can use figures to do several things:

- Motivate the reader.
- Point out important ideas.
- Clarify text.
- Identify or summarize information.
- Teach a principle, technique, or procedure.
- Stress equal importance of both genders and all races and age groups.

Motivating the reader

Suppose you want to get your students' attention and motivate them to do carefully a task that seems routine and dull. What can you do if you want to get them to do a difficult task more quickly or safely, or to learn a set of safety rules? How can you maintain their interest in these subject areas? One way is to use small, simple pictures, called icons, to accompany discussions. These icons, such as the handshake depicted here, may grab the students' attention in a way that words alone cannot.



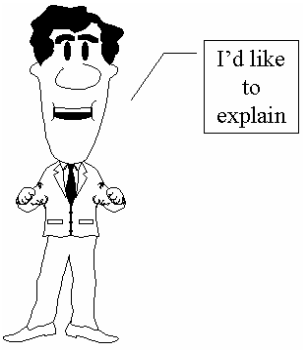
Icons and figures are not the same. Icons are small, simple pictures. They are not numbered. If you have trouble distinguishing between icons and figures, use this decision table.

Figure or Icon?	
Figure	Picture carries information that the student must have.
Icon	Picture is small and simple and does not carry essential information.

Resist the urge to use a lot of icons. Too many clutter up the pages and distract rather than enhance. If you use too many, your ISS may be forced to decide which to scrap.

Icons in the text are for occasional use, not for use in every paragraph or on every page. Keep your icons small.

Send icons to the Institute in graphics format. Do *not* insert icons into your Word files.



Identify the icons for us and state very clearly where you want them placed. Name icon graphics files logically. You might name the icon file for the handshake "ICON4–01.WMF" and the icon file for the explaining man as "ICON4–02.WMF." In the text, at the *beginning* of each paragraph that is to have an icon, type "[[[icon 4–01 here" or "[[[icon 4–02 here," and so on. The editor will insert the icons and delete your instructions. We will *not* use legends with icons.

If your career field uses a special symbol, character, or emblem that you want to use as an icon, have the graphics shop create it as a graphics file for the editor to insert at the right place.

One of the best ways to motivate your reader is through the use of cartoons, such as the one in figure 4–1. While cartoons can be useful, good taste and absence of derogatory or demeaning content in visual information are musts (AFH 33–337, *The Tongue and Quill)*. If you use negative examples, be sure to explain to the students the correct procedures, rules, and so on.

Figure 4–1. Motivating your reader.

Pointing out important ideas

Have you ever "pictured" an idea? We hope so, because a picture is often the best (maybe the only) way to convey a thought. Pictures give instruction and information as well as entertain.

In a discussion of internal combustion engines, figure 4–2 enables a student to compare two types of operation. The student can see at a glance the difference between the Brayton cycle gas turbine engine and the Otto four-stroke piston cycle engine. Would you rather try explaining that verbally or graphically?

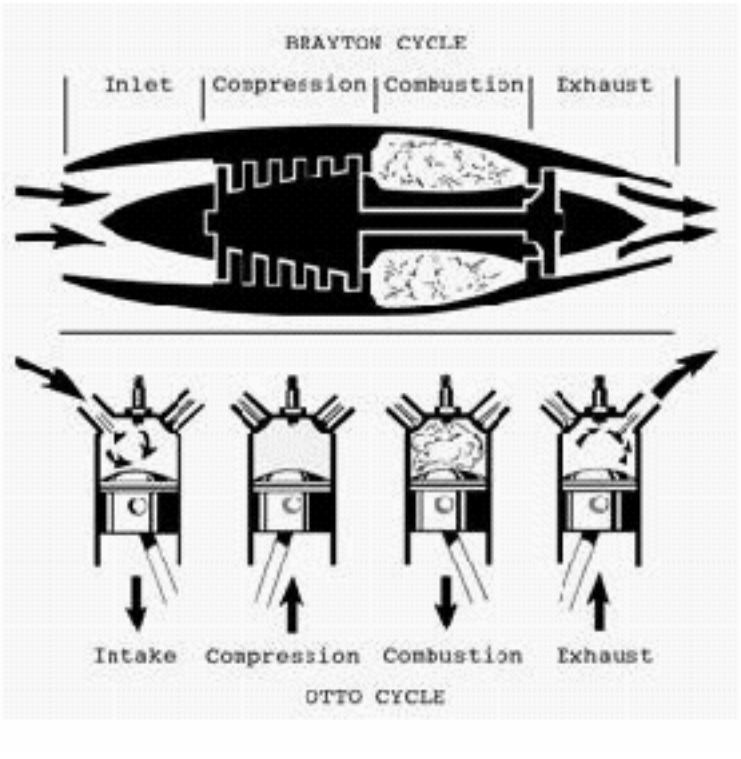


Figure 4–2. Pointing out an important idea.

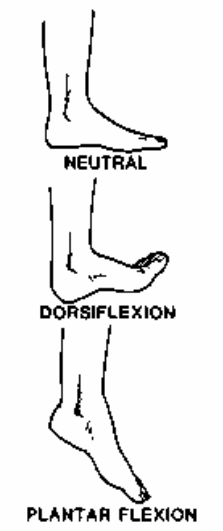


Figure 4–3. Clarifying terms.

Clarifying the text

You can clarify a concept or procedure easily and quickly with a figure. Note how a course author defined terms using pictures rather than words in figure 4–3.

When using a figure to clarify your text, keep in mind one essential principle: Include only as much as you need—no more. A cluttered figure may distract, confuse, or even mislead.

Do not direct the student to the figure by using such words as *above, below, to the right, to the left,* and *on the following page.* When you are writing a manuscript, there is no way of knowing just where your figure will be printed. Refer to the figure by number only.

Identifying or summarizing information

To help students learn to identify things, have them find parts or label components. For example, in figure 4–4, which shows how to field-strip a .45-caliber Colt pistol, a self-test question might require students to write the name of each numbered component in the blank lines.

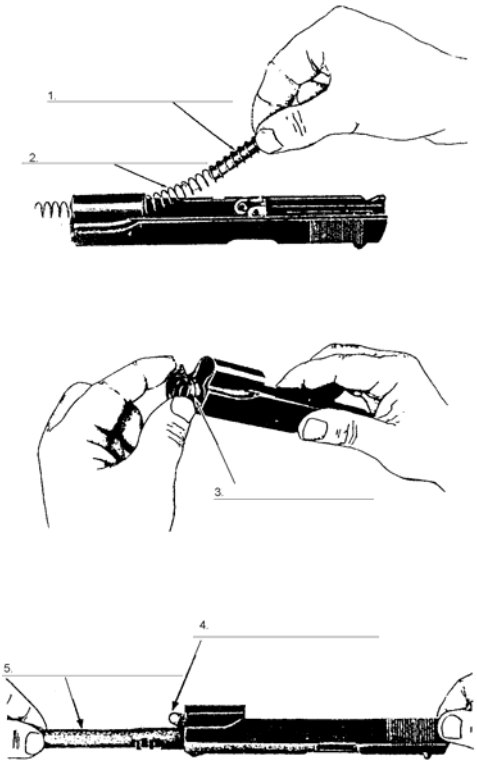


Figure 4–4. Identifying information.

Besides identifying material, you may want the student to summarize data or arrange it in a systematic order. In this case, consider using a table. We discuss tables in detail later.

Graphs are a great way to show comparisons and evaluations of data. They allow quick visual comparison and easy access to data.

Make sure, though, that you use the right chart or graph for your purpose. For example, suppose you were trying to teach how temperature affects O-ring performance. Figure 4–5, which shows

recorded O-ring damage, would not be suitable for showing the direct relationship between temperature and damage. Note how much easier and more clearly the graph in figure 4–6 shows the relationship between O-ring damage and low temperatures.

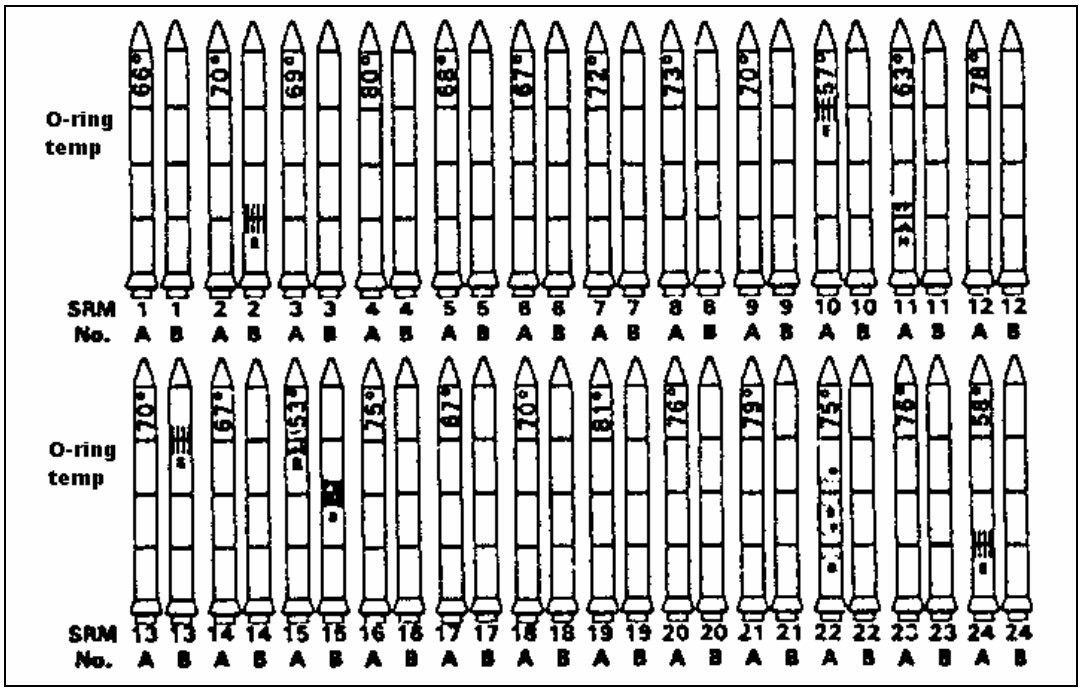


Figure 4–5. Use graphs for quick visual comparison of data (inappropriate use).

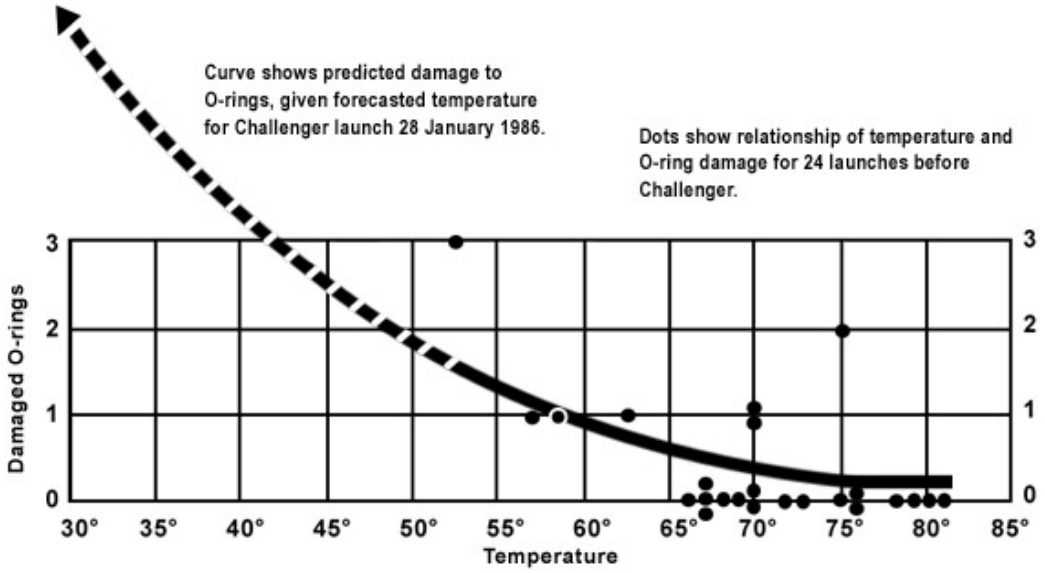
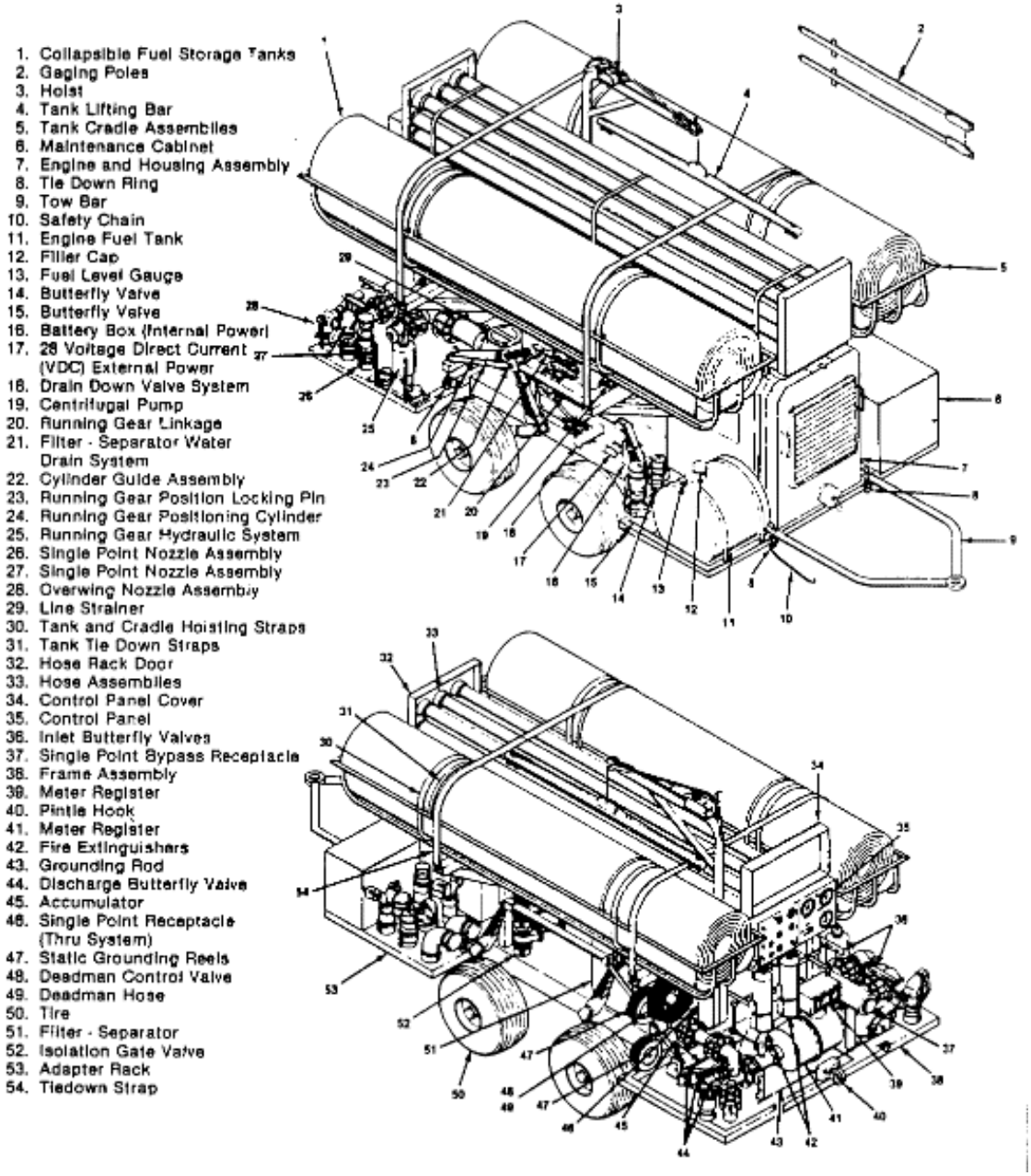


Figure 4–6. Use graphs for quick visual comparison of data (appropriate use).

Be careful not to include too much detail in a single figure. You can see that figure 4–7 has entirely too much information for one graphic. Also note that the quality of the graphic the course author sent us is not sharp enough for the detailed information portrayed.

Rather than having a single figure show all components, use several figures. Use an “overview” to show the entire component, and use other figures, as needed, to break the overview into groups. This approach allows you to illustrate various parts of the equipment in as much detail as needed and to associate various pieces of the overview with the appropriate text discussions.

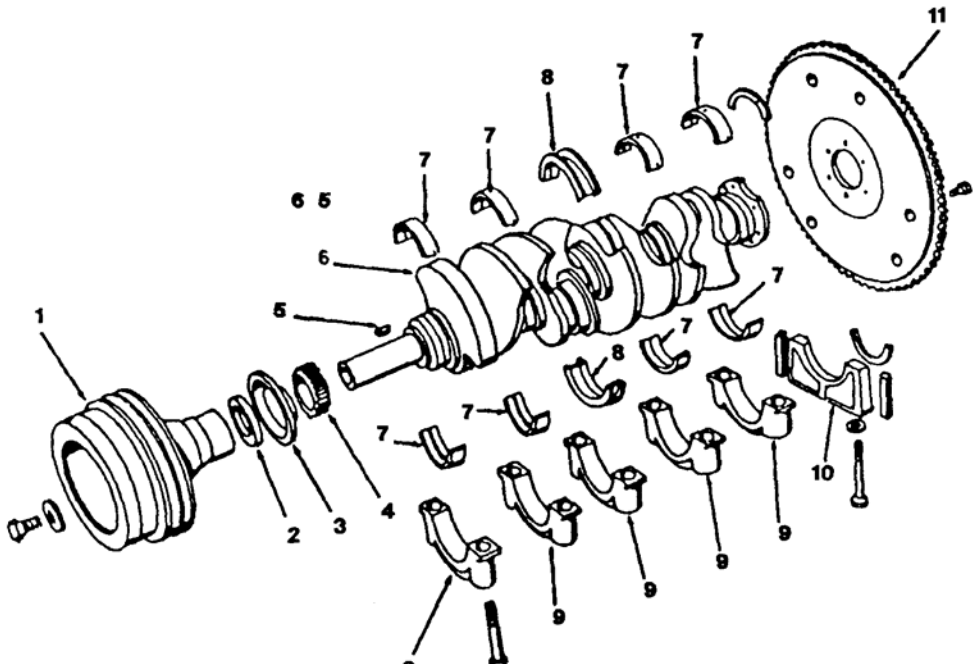


4–7. Too much information in one graphic.

An exploded view (fig. 4–8) can show the relationships to each other of the parts of an assembly. It is also effective when you want the student to identify parts. In figure 4–8, the student is given a key figure that is used throughout the lesson to show how components are connected. Note the callout numbers and legends.

When there is only one figure with callouts illustrating a discussion, you don't have to give the figure number each time you refer to a callout. However, if there are two or more figures with callouts, give the figure number each time.

Make your callout references simple and straightforward: "Notice items 6 and 7 in figure 4–8," or "Now look at how the crankshaft (fig. 4–8, item 6) and the main bearings (fig. 4–8, item 7) are assembled." If there is no other figure with callouts in the vicinity, you might say, "Refer to figure 4–8 as we discuss the problem areas. The flywheel (item 11) is connected to the…."



1. **DAMPER ASSEMBLY**
2. **FRONT OIL SEAL**
3. **OIL SLINGER**
4. **CRANKSHAFT SPROCKET**
5. **WOODRUFF KEY**
6. **CRANKSHAFT**
7. **MAIN BEARINGS**
8. **CENTER MAIN BEARING**
9. **BEARING CAPS**
10. **REAR OIL SEALS AND RETAINER**
11. **FLYWHEEL**

Figure 4–8. Exploded view.

Teaching a principle, technique, or procedure

Graphics are ideal for self-test questions on mathematical or electronic principles. For instance, from the circuit information given in figure 4–9, the student calculates unknown values. Several self-test questions (not shown) use the same figure; it not only helps to teach a principle but also unifies the text.

If a schematic is complicated, identify the area of the schematic to which you are referring; for example, “figure 1–8, upper left.” To help your students understand complicated diagrams, first provide a block diagram and then a schematic.

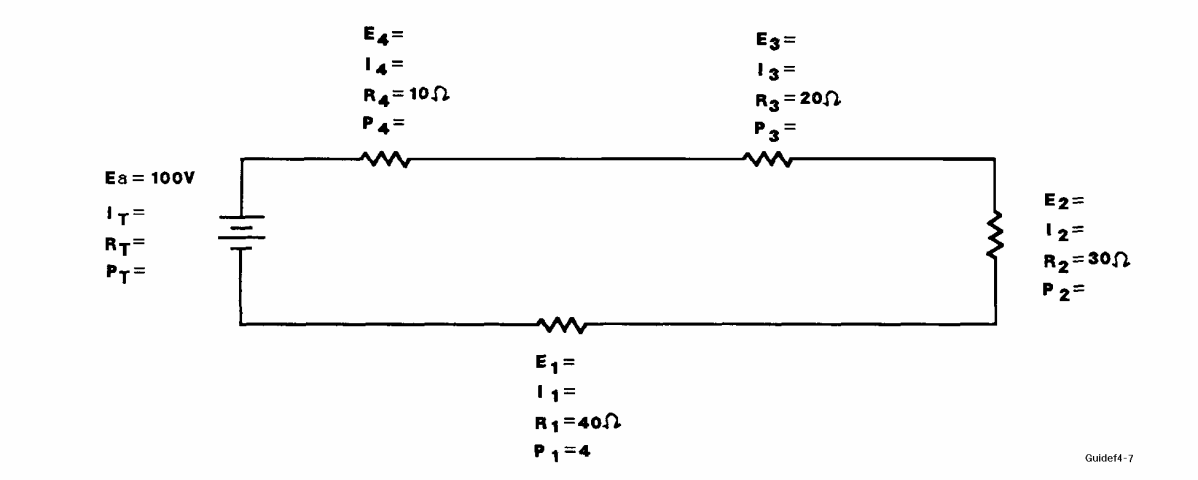


Figure 4–9. Teaching a principle, technique, or procedure.

To simplify references to schematics and involved diagrams, use “map” grids on your foldout; for example, “The fuse (FO 1, B6) functions as a.…” An example of a gridded foldout is shown in figure 4–10. (We discuss foldouts in more detail later.)

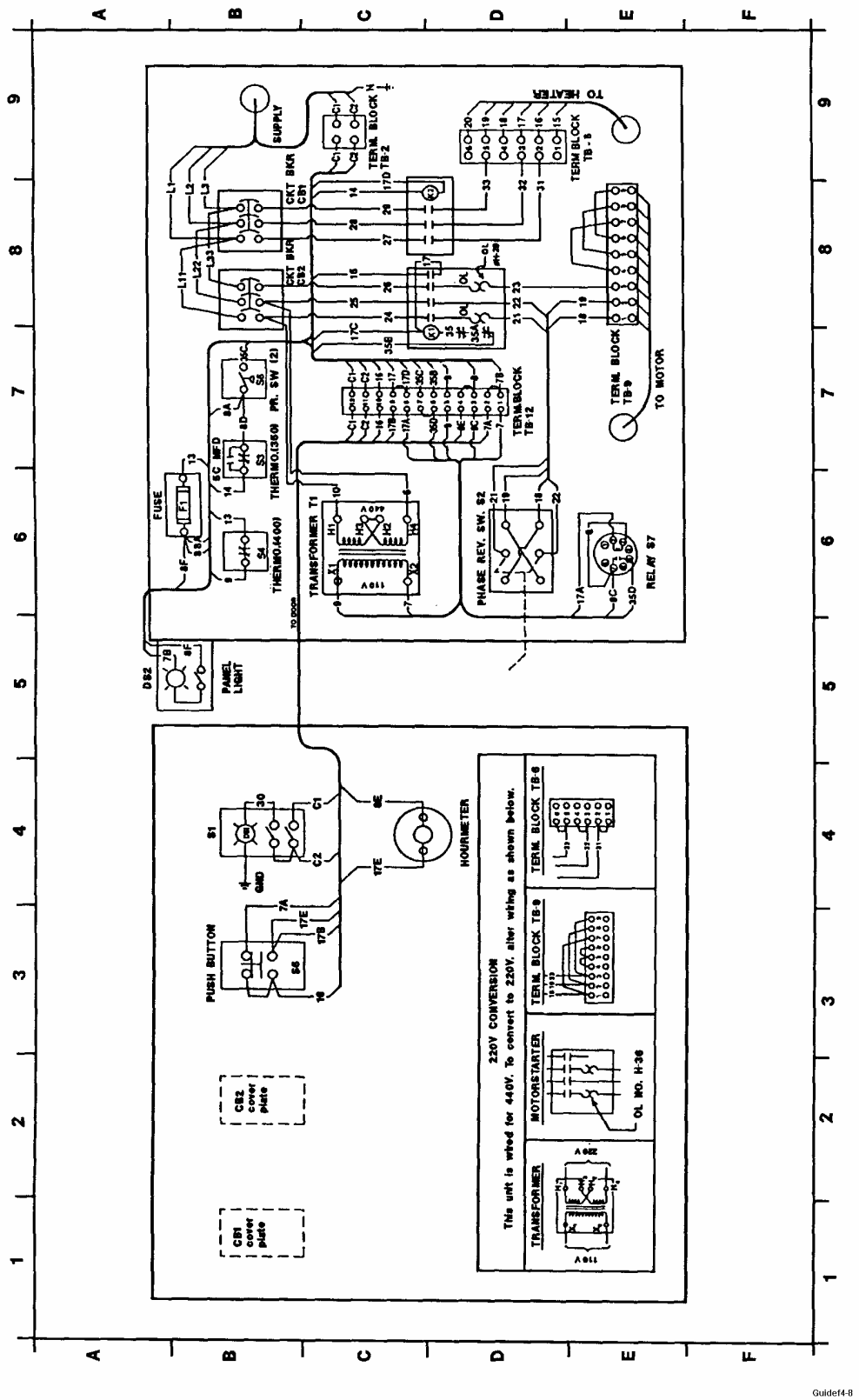
If you have long text passages that relate to an intricate figure, make enough references to parts of the figure to support the extended discussion. Occasionally, a figure can convey its message without help from the text. But most figures we publish—particularly schematics, parts breakdowns, and so forth—are too involved to do much teaching without assistance from the text. If the figure is worth including, it is worth talking about. Call the student’s attention to significant elements and relationships; tell him or her to notice this, trace that, and so forth.

Along with textual references to figures, legends should help explain matters to the student. Make the legends specific.

Stressing equal importance of both genders and all races and age groups

Effective teaching avoids alienating students. Students must be able to see themselves participating. Avoid stereotypes that associate some occupations with a single gender. For example, not all nurses are female and not all doctors are male.

We have given a sample of the ways in which figures can teach. As you think about your specialty, you may find more ideas for the creative use of graphics—or better uses of existing ones.



Guidef4-8

Figure 4–10. Gridded foldout.

4–2. Understanding Technical Requirements and Limitations

Line drawings teach better than do figures made from photographs or shaded drawings. Line drawings let you omit nonessentials and highlight the main points. Your graphics shop can make a line drawing from a photograph. Graphics experts can delete any extraneous information while making a sharper, better-focused teaching tool of it.

Your ready-made graphics resources include files you inherited, archives at your graphics shop, and artwork in someone else's course—if you can get that person to send you an electronic copy of the artwork or if it can be scanned in or redrawn. Send us "clean" digitized figures; that is, check to make sure your graphics shop deleted any extraneous lines and smudges. The clean figure *must be usable*—if we cannot *view* a figure on a computer screen and *print* it from an electronic document, it is useless.

Keep in mind that you must send a new electronic copy of each figure for each volume each time you send the volume. *The Institute does not and cannot archive graphics*. We are neither staffed nor equipped to archive graphics for hundreds of books.

Can you do your own graphics?

You can *legally* use your "regular issue" computer and software to create your own graphics to support your own writing project. However, we don't want you to create the graphics you send us, and for good reasons.

Graphics storage in a central repository, not in individual offices, is essential. Having all graphics archived at the graphics shop, where any CDC writer or resident school instructor can get to them, is essential to cost-effective production.

You have little enough time to write the text of CDCs. Let the professionals in the graphics shop prepare the graphics and archive them. Because they do such work all day every day, they can do it quickly and surely.

Examine digitized graphics from *any* outside source for quality and have them archived at the graphics shop. If you find an error in a graphic, get the graphics shop to correct it so that the improved graphic will be archived.

The Institute prints all courses by electronic means. Send us *only* graphics that have been digitized and that import directly into a Word document.

You may do your own icons *if* you create them as graphics files from clip art provided by standard Air Force software, such as Microsoft PowerPoint and Microsoft Word. *Don't insert icons, or any other graphics, directly into your files.* See your Microsoft manuals or help screens for detailed instructions on how to save clip art in standard graphics file formats.

Working with your graphics shop

Work closely with your graphics shop to help the illustrators visualize your ideas. Illustrators may create new graphics for you, or they may adapt existing figures to your needs. Ask to see their catalog of figures. You may find on file just what you need. Using a figure from their file will save time and money.

Working through your graphics shop will save you time and effort. It may also save you a call from the Institute saying your figures are unusable because they are in a wrong format, they cannot be imported to our system, they cannot be manipulated because you inserted them into the text, and so forth—all of which are *production-stopping* problems.

The same rules apply when you make a figure from a piece of text in an Air Force publication. Get your graphics shop to do the work for you. They will get it into the proper format to be sent

as a figure, and the editor will be able to manipulate it as necessary to make sure it teaches as well as possible without interfering with page layout.

By contract, your graphics shop has a certain amount of time to fill your work order. Turn in your work as soon as you can. If an artist must prepare your figure, see that the rough copy is right before you send it. Doing so may prevent panic later.

Make sure your graphics shop understands the requirements in this *Guide*. When you get ready to talk with the graphics people, copy the AFIADL Graphics Requirements sheet from appendix page A–14 and take it with you.

General graphics requirements

To relate all there is to know about the preparation and use of graphics would require volumes (and only a graphics specialist would be able to understand it). Here we make a bare minimum statement of requirements.

Send graphics in both digitized and hard-copy formats

Neither the Institute nor DAPS archives graphics for your use. The graphics shop will give you a digitized graphic and a coordination hard copy made from the digitized graphic.

Allow ¼-inch white space of margin around an electronic graphic

Either *too much* white space or *no* white space makes working with a graphic in page layout very hard.

Do not draw a box around the graphic

We will put a border around a graphic if it needs one.

Do not send two electronic files to be made into one graphic

To present two figures together, get the graphics shop to merge the graphics into one file.

Combine figures for comparison and contrast

If a student needs to compare and contrast several similar items, send a figure that presents the items *together*. For example, instead of 10 little figures of screwdrivers, send one figure that shows 10 screwdrivers, each identified by labels or by callout numbers and sublegends. Orient the items in the figure logically, both to use the space in the figure economically and to facilitate the comparison and contrast.

Separate small objects

If a student doesn’t need to compare and contrast items, send separate figures for small objects so that the editor can put the pictorial information as close as possible to the related text.

Do this only (1) if there is no need to keep the objects together for comparison and contrast, and (2) if use of a single figure would cause the student hardship in following an extended discussion.

Graphics format

Include the graphics format type in figure file names on the disks; for example, F1–01.JPG. All graphics *must be* submitted to AFIADL in the JPG file format. Joint Photographic Group (JPG) format is commonly used for photographs and highly detailed illustrations. The JPG has adjustable compression and resolution levels. A high-resolution image with a low-compression rate will create a larger file size. JPG files are also easily imported and print with no problems. They are also Web-ready.

Do not create graphics in Microsoft Word using Word's drawing tools and functions. We must be able to manipulate the size and placement of the graphic during page layout. Graphics created as Word (.DOC) files hinder our ability to do this quickly and easily in a phase of the development process when time is crucial. You may type text figures (such as tables) into unit files. However, if you do this, you must stay within standard margins.

Save graphics created in Microsoft PowerPoint in the JPG graphics format rather than the presentation (PPT) format.

Resolution

DAPS uses laser printers with a default resolution of 600 dots per inch (dpi). Have your graphics shop scan at an appropriate resolution for this output.

Send properly oriented graphics

If a digitized graphic is tilted, have the graphics shop straighten it. Decide whether you want *portrait* or *landscape* presentation. "Portrait" is a term used to refer to *vertical page orientation*. "Landscape" is a term for *horizontal page orientation*. (If you want a picture printed sideways on the page, you want landscape orientation.)

Your graphics shop needs to know that all graphics will be inserted into portrait-oriented pages. If a graphic is to appear in landscape orientation in your CDC, it must be rotated 90º counterclockwise by your graphics shop (this should make the head of the graphic on the left side of the file).

Remember, which end is *up* may not always be obvious to us, so be sure to submit hard copies showing the proper orientation.

Viewing graphics in Word

To check graphics files you get on disk from your graphics shops, you don't need special graphics software. You can inspect your pictures by inserting them into a Word file:

1. Open Microsoft Word.
2. If a new file does not open automatically, click on the New button on the standard toolbar.
3. On the menu bar and drop-down menu, click on Insert, Picture.
4. In the popup box, make sure the small box to the left of the words Preview Picture has an x in it.
5. Make sure the drive and directory where your graphics files are stored are shown in the box under Directories. If you are viewing graphics from a diskette, be sure to select A or B in the box under Drives.
6. Click on the file name of the graphic you want to see. It will appear in the preview window.
7. If you can see the graphic in the preview window, you can select another file name to view or select the Cancel button from the bottom of the box.

8. If you need to see the graphic in larger proportions, click the OK button to insert the picture into the file.
9. Repeat the process until you have checked all your graphics.
10. Close the file without saving it. You have no need to save the file, since you created it just to inspect the graphics.

Graphics identification

You must identify graphics properly for editors to put them where they belong in the text. References to graphics in the text must be precise so that students can easily find the graphics discussed.

Identifying graphics in the text

Refer in the text to the dual number of each graphic (1–1, 1–2, 1–3, etc.). The first part of the figure number is the unit number, and the second part of the number is the figure's sequence within the unit.

Besides making a text reference to each figure, you must type the figure number and title into the text as a *legend* for editors to place figures properly.

Legends in the text

Enter each legend (figure number and name of the figure) below the first paragraph in which you refer to the figure. In each legend, capitalize the word *figure* and the first word and any proper nouns in the figure title. Use the legend style for legends. (See appendix page A–7.) Also leave a blank line above the legend for the editor to have space in which to insert the related graphic.

File name conventions

Use the dual numbers as file names for the digitized graphics. For instance, if the graphic is figure 1–1, the file name should be F1–01.JPG. If you are sure which file names will go with which figures *before* you take your graphics work order to the graphics shop, you can get the graphics shop to assign the file names; otherwise, rename the files with the proper numbers after you have organized your material and decided on figure placement.

Have the graphics shop make the graphics identification number as small as practicable and put it at the *bottom* of the graphic, about
¼ inch below all text on the graphic. Make the text of the graphic identification number just large enough to be legible. (Large identification numbers can detract from the figure.)

Figure numbers on coordination copies

Write the CDC number, volume number, and dual-figure number in the lower right corner of each coordination copy you send; for example, CDC 1C351–02, fig. 1–1.

Multipart graphics

If you use more than one graphic to illustrate a single concept, or if you present a document, such as a form, in more than one graphic, number each graphic separately and give each graphic a distinct title. For instance, if you present AF Form XXX in two graphics, showing the front and the back of the form, you might identify the graphics with these legends:

Figure 1–1. Sample, AF Form XXX (front).

Figure 1–2. Sample, AF Form XXX (back).

Figure numbers and legends in figures

If you plan to use an existing figure that has a number and a legend *in* the figure itself, ask your graphics shop to delete both the number and the legend.

Identification system for appendixes and foldouts

Identify appendixes alphabetically by capital letters. Identify foldouts by consecutive numbers throughout the text. (See appendix page A–12.)

Horse sense

Proofread your graphics for spelling, grammar, punctuation, symbols, and terminology consistent with the text as soon as you get them from the graphics shop. Immediately take any figures that need work back to the graphics shop. Use the old work order if the flaw is the fault of the graphics shop. Incorrect graphics result in downtime charged to the preparing agency.

Send hard-copy graphics separately—one per 8½-by-11-inch sheet of white bond paper—*and in sequence!* With each volume you send, send only the graphics for that volume. That is, do not mix the graphics for two or more volumes.

Types of figures

Types of figures include:

- Cover art.
- Charts.
- Forms.
- Tables.
- Foldouts.
- Photographs.

Cover art

Use of a cover figure is an *option*. Send the cover figure in portrait orientation. Your cover figure should be the figure only, not the entire cover. Do not include the graphics identification number in the figure. Identify it as COVER.JPG. Send a cover figure file and hard copy with each volume of the course for which you want cover art.

A pictorial representation of your AFSC does more to teach and inspire than does an organizational shield. If you use a shield, have your graphics shop incorporate it into a design.

Charts

If your reference data is extensive, as in some troubleshooting charts, you may set the chart up as a foldout rather than a figure. (See “Foldouts” later in this section.) Be sure charts are neat and clearly arranged. Spell out all words if possible.

Forms

Consider carefully before you decide to use an Air Force form, or any other standard form, as a figure. If a form is self-explanatory or carries its own instructions for use, just give its number and title and tell when the student will use it.

You may have access to the Air Force Publishing site: http://e-publishing.af.mil/. You should be able to get all the forms you need for your CDC through this source. Before you spring into action to use any forms, study the information here carefully. The guidance here can keep you from mistakes that will plague both you and the Institute.

Use the current form

Verify the currency of a form (edition date) on the Air Force Publishing site given above.

Instructions and completion of forms

Look at AFI 33–360, volume 1, paragraph A4.23. The Air Force *prohibits* (1) using blank forms as figures in our books and (2) using instructions for filling out a form if those instructions are given on the form itself.

Do *not* send a blank form as a figure. Instead of using a blank form, fill it in and offer it as an example of how to use it. Let your graphics people enter the information to make sure it is entered legibly.

If the form you send has instructions for its use printed on either side, do *not* repeat the instructions in the text, just tell the student the form carries its own instructions. (If the instructions are unclear, tell the OPR!)

If there are no instructions printed on the form, include them in the text.

Send forms in digitized format

Your forms should be submitted as a graphic in an electronic format, just like all other figures. Check with your graphics shop to see what they need from you to create the electronic file. They will probably want you to provide a filled-in hard copy exactly as you want it to appear in the CDC. Air Staff authorizes manipulation of the size or other attributes of a form to enhance its use as a visual aid.

Use a current date

When you fill in a sample form, use a current date. If you are writing in 2000, use 2000 as the year on the form.

Send double-sided forms properly

If a form is printed on both sides, and if you need to show the two sides as separate figures, tell your graphics people to give you a separate graphic for each side of the form.

Tables

You may type tables into the text or send them as graphics.

In-text tables

Create *simple* tables in your unit files and do *not* give them figure numbers unless you refer to them elsewhere. Create each table just below the paragraph that refers to it first. If an editor needs to move the table for page layout, she or he will add suitable text to refer to the table's placement. Final page layout is the Institute's concern, but you should send tables in a certain format. Follow these guidelines:

- Style—Table Text Style (on toolbar).
- Border—Word's default grid border.
- Headings—bold and designated as headings in the Table pull-down menu.
- Position—center rows between the left and right margins.
- Numbering—no figure number needed, unless you refer to the table elsewhere.

Below is a sample table taken from a CDC. It summarizes and organizes difficult to explain information clearly and concisely in a paragraph.

Try to arrange data in a table compactly. Put numbers in a column, rather than in a line, because they are easier to compare that way, as in the sample table below. Omit *unnecessary* zeros when all the figures in a column are of the same order. For instance, in a column listing numerals in thousands, omit the last three zeros and note in the heading that figures are in thousands. Put footnotes for a table directly below the table, not at the bottom of the page.

Metric Prefixes (based on one meter)			
Prefix	**Symbol**	**Numerical Value**	
Mega	M	one million	1,000,000.00
Kilo	k	one thousand	1,000.00
Centi	c	one-hundredth	0.01
Milli	m	one-thousandth	0.001
Micro	µ	one-millionth	0.000001

Tables as graphics

If a table is very involved or if you want the table *printed in landscape orientation,* ask the graphics shop to prepare it in a graphics file format. You may choose to save a table you create as a separate file for the editor to insert. In this case, give the file to the graphics shop to prepare in graphics file format. Have the graphics shop orient the table as you prefer: portrait or landscape.

Send *any* table that is a graphic to us as a dual-numbered *figure,* in sequence with other figures. For example, a table of allowances sent in as a figure, in a graphics file format, should have a legend that looks something like this:

Figure 1–3. Table of allowances.

Foldouts

Use a foldout when you have too much material (as in a schematic) to squeeze into a full-page cut. The physical limitations to consider as you prepare the oversized figure we call a foldout are:

1. The maximum width of the foldout that our press can handle, including gutter page and right margin, is 35 inches.
2. The size of a page in a book published by the Institute is 8½ inches wide by 11 inches tall.

To provide a margin for binding and a minimal half-inch margin at top, bottom, and right side, ask your graphics pro to make the actual printing on your foldout, including foldout number and title, no more than 32 inches wide and 9¾ inches tall.

Suppose you have a foldout that, reduced to meet size restrictions, would be worthless because the printing or the drawing on the foldout would be too small to read. (Your graphics pro can help you decide.) Mark the foldout itself and its legend, in parentheses, as an “oversized foldout/separate enclosure,” and say in your letter of transmittal that your package has such a foldout. Number the foldout in the sequence in which it will be introduced in the text, just as you do other foldouts.

If you want the student to have several figures in view throughout a lesson, consolidate the figures in one foldout and label them *A, B, C,* and so on. Then, refer to the figures like this—foldout 1, view A; foldout 1, view B; and so on. (If references are in parentheses, use FO 1, view A; FO 1, view B; and so forth.) Make sure that the A-B-C sequence on the foldout follows the sequence of the textual discussion. If necessary, use more than one foldout.

We do *not* require digitized foldouts; we do require foldouts *of print quality* in the dimensions given above. To accommodate print-on-demand requirements, the Institute has foldouts bound separate from the text.

Photographs

Some illustrations—X rays, for instance—just will not work as digitized graphics. In such instances, you may have no option but to send photographs to be used in your CDC. What are the rules for sending photographs?

- Discuss the possibility of using photographs with your course development team to get the latest guidance.
- Make sure photographs are glossy black-and-white or color, or 35 mm slides.
- If they are color, send a letter of justification for the use of color.
- Do *not* send screened photographs; they reproduce poorly.
- Identify photographs in the letter of transmittal.
- Package photographs between pieces of stiff cardboard or other materials that will keep them from damage.

NOTE: Do *not* send nondigitized material unless that is the *only* way possible to send a graphic. Use of nondigitized material in a volume impairs that volume's electronic storage, transmission, and retrieval. All course materials must be in electronic form for our process to work. Thus, it is *critical* that you send only digitized text and graphics for publication if at all possible.

Figure sizes

The size of a figure in the final printed version of your course may be larger or smaller than you envision as you write. Because the editor enlarges or reduces figures in laying out the text pages, you need to be aware of these points:

1. A small figure distorts (loses detail) when it is enlarged.
2. A larger figure retains detail when it is reduced.

For these reasons, we recommend that you have your graphics shop size all figures (except icons and foldouts) to a 6-by-9-inch size. Use this standard size for both portrait and landscape orientation. This is the size of a full-page figure. When the editor reduces it in layout, the smaller version will retain the detail.

NOTE: You can do much to make your book readable by previewing all your graphics (previously used and new) to be sure (1) similar graphics are sized similarly, (2) text on graphics is legible without blowing illustration up to an enormous size, and (3) graphics shop identification numbers aren't so large that they appear to be part of the graphic.

Use of color

Conceivably, any type of figure *could* require the use of color. DODD 5330.3/Air Force Supplement, *Defense Automated Printing Service (DAPS)*, tells us about the use of color in graphics in CDCs:

> 5.3.2.2. (ADDED)(AF) DAPS cautions OPRs that printing in two or more colors generally increases costs. Consequently, it is the OPR's responsibility to ensure that all multicolor printing contributes demonstrable value. DAPS will recommend that OPRs print all documents in one color, unless additional color is integral to the purpose. Examples are maps and illustrations of medical specimens or diseases; plants; flags; uniforms; safety; fire prevention; attention-catching recruiting posters. Do not use color solely for its decorative effect or for prestige. Use of excessive printing specifications such as coated paper, multicolor inks, embossing, die-cutting, foil stamping, etc., should also be avoided when less expensive methods and items will do.

If you have a graphic that simply cannot do what it needs to do unless it is in color, send a letter of justification for use of color along with your other materials. The official who signs your transmittal letter should also sign this letter.

Your checklist should also indicate that color graphics are included in your package. The Institute will seek approval for printing.

If you have a large number of graphics that require color, talk with our Blended Learning Team members (DSN 596–2001), who might suggest a multimedia (hybrid) solution. If you need to use four pages or more of colored graphics, a CD would be cheaper.

Summary

Use this checklist for figures you send to the Institute.

	Do you have enough figures to teach the material?
	Have you deleted unnecessary figures or figures that needlessly duplicate text?
	Did you make sure that figures are not too intricate or profusely labeled?
	Are your detailed figures labeled completely?
	Are figures free of derogatory or demeaning material?
	Are illustrated forms current and filled in with proper information?
	Are foldouts gridded for easy reference?
	Did you make sure that no figure includes a figure number or legend on the figure itself?
	Have you proofed your figures for spelling, grammar, punctuation, symbols, and so forth?
	Is there a text reference for each figure?
	Does each text reference correlate properly with a figure?
	Is terminology consistent between text and figures?
	Did you enter legends in the text and format them properly?
	Did you indicate placement for any icons?
	Have you proofed the legends in the text and in the legend list for spelling, grammar, punctuation, symbols, and so forth?
	Did you group legends in the legend list by test item figures, appendixes, and foldouts?
	Are copyright releases and acknowledgments for figures correct? Do legends include required references to copyright owner's permission?
	Does the file name for each electronic figure have the correct file name extension?
	Have you properly labeled each floppy disk?
	Have you included a coordination copy of each figure or CD?
	Did you identify the CDC, volume, and figure number on each coordination copy?
	Did you give any special instructions in the letter of transmittal for unusual figures?

Unit 5. Testing

SELF-TEST QUESTIONS, unit review exercises, and course examinations are feedback and evaluation tools. STQs give students immediate feedback and self-evaluation on small amounts of information. UREs continue the teaching process by giving students a review of entire units. CEs evaluate student learning and provide feedback to the student and to test developers on the effectiveness of the course. Part of your job as a course author is to write good multiple-choice and self-test questions. Further, you must maintain questions in printed courses and in the course examinations. You'll sometimes have to correct, rekey, or delete questions based on statistics and student inquiries. This unit explains both the creative and the maintenance processes so that you can keep a top-notch course in the field.

5–1. Writing Test Items

Multiple-choice items, like topical statements, address the most important points, and you must write them at the proper level of proficiency. Multiple-choice items must be related *directly* to their corresponding topical statements. This is critical for content validity.

If a topical statement says students must *convert* binary numbers, don't write an item asking students to *identify* or *add* binary numbers—ask them to *convert*. In the box below is an example of a good match between topical statement and multiple-choice item.

If your topical statement is:	433. Converting binary and decimal numbers
Your multiple-choice item stem might be:	What is the binary equivalent of $634_{(10)}$?

The multiple-choice items you send in your U0.DOC file are the source for both the UREs *and* the CEs. The URE highlights key teaching points. In fact, the unit review exercise might be the most valuable tool for a student to get a true feeling for what is most important.

The essential word in the term "unit review exercise" is *review*. In our courses, review exercises continue the instructional process—not by introducing new points, but by reinforcing essential information and identifying gaps in student learning.

Properly written, a multiple-choice item can teach terminology, facts, principles, and applications. It is especially effective as a means of requiring students to select the most important information from an array of data.

The parts of a multiple-choice item

The multiple-choice questions that we use consist of:

- A *stem*.
- Four *options*.
- One *keyed response*.
- Three *distractors*.

These terms have specialized meanings in test development.

Stem

The stem is the *statement of requirement.* The stem may ask a question, direct students to do something (imperative), or begin a sentence that students must complete by selecting the right word or phrase (incomplete statement). These examples show the three stem types.

Question

How much force is needed to slide a 100-pound box along a concrete floor if the coefficient of friction between the box and the floor is 0.4?

a. 25 pounds.
b. 40 pounds.
c. 60 pounds.
d. 100 pounds.

Imperative

Compute the force needed to slide a 100-pound box along a concrete floor if the coefficient of friction between the box and the floor is 0.4.

a. 25 pounds.
b. 40 pounds.
c. 60 pounds.
d. 100 pounds.

Incomplete statement

Given a 0.4 coefficient of friction between a 100-pound box and a concrete floor, the force needed to slide the box along the floor is

a. 25 pounds.
b. 40 pounds.
c. 60 pounds.
d. 100 pounds.

NOTE: The stem to a multiple-choice item should not be a true/false question in disguise, such as this one: Which of these statements is true concerning …?

Options

In a multiple-choice item, options are *plausible* answers to or completions of the stem. We use four options in all multiple-choice questions. Only one option satisfies the requirement of the stem—the keyed response. The other options are distractors.

Keyed response

Write one option that is clearly the correct response. Make sure the text supports it.

Distractors

To an unknowledgeable person, each of the other three options must look as if it could be the correct response, though it is not. In fact, the value of your multiple-choice items depends largely on your skill in writing *convincing but incorrect* distractors.

Guidelines for writing multiple-choice items

Use the guidelines and examples on the next few pages to help you write good test items. The guidelines are not all-inclusive; but they can help you to send good multiple-choice items.

Always review your items carefully and, if possible, have someone else review them. You may not see problems because of your familiarity with the subject matter.

Write items only on material in the lessons

You must never put essential information in introductions; therefore, you must never write items on introductions and summaries. Develop multiple-choice items on lesson text only.

Make sure items address the topical statement

Your topical statement must drive the type of multiple-choice item you write. This relationship is basic to good instructional systems development. Your ISS, of course, looks for text support in the lessons, but the ISS also looks for that all-important *direct relationship* between the objective announced in the topical statement and the multiple-choice item:

Objective of topical statement → multiple-choice item

Course authors often have trouble with this connection and send us items that do not address their corresponding topical statements. Obviously, if you don't send us appropriate items, you can experience production delays while we wait for you to write new items and send them to us or while the ISS rewrites your items and coordinates them with you.

To understand better what you need to do, look at the topical statement and the two multiple-choice items below. Note that the original item did not relate directly to the topical statement. The writer asked the student to tell how the barrel assembly on the Hamilton Standard propeller is secured. This may be important, but it's not the objective of the lesson. The item in no way measured whether or not the student learned the *function* of the barrel assembly, as specified in the topical statement.

009. Functions of the assemblies on the Hamilton Standard propeller

What the item writer said:

The barrel assembly is secured to the propeller shaft by
a. a hub nut.
b. lockrings.
c. an extension.
d. a splined coupling.

What the item writer should have said:

On a Hamilton Standard propeller, the function of the dome assembly is to
a. prevent the blades from decreasing pitch if pressure is lost.
b. provide a stop for the dome piston steel sleeve.
c. transmit engine torque to the propeller.
d. change the propeller blade angle.

Make sure items are clearly text supported

Make sure students can find the correct response to each item in the lesson text. The correct answer can be clearly stated or implied, or that the student can logically deduce or calculate the answer on the basis of the text.

Sequence items in the same order in which they are supported in the text

Psychologists and professional educators say that information presented in a logical sequence, logically linked, is a great deal easier for students to learn and to recall, whether in total or one piece at a time. Probably none of us has any trouble agreeing with them on that.

It may be a little harder to see, but it is equally true, that multiple-choice test items are more effective if they are presented in the same sequence in which they are supported in the text. The student can mentally scan the pertinent text from the beginning to find the answer. This scanning process not only reinforces the answer in its immediate context (so very important in understanding a procedure, for instance) but also reinforces the text as a whole.

Nearly all course authors send in materials that properly group test items by lesson number. Unfortunately, many authors fail to sequence test items *within* lessons. Whatever the reason for it, this lack of sequence makes it harder for the student to recall information, so reinforcement is weakened. Lack of sequence also hampers the student's review of the text (more reinforcement) after answering the URE, and it hampers our efforts to verify your work. *Sequence test items within lessons!*

Make sure item stems state a central problem

The item stem should present a definite problem that is meaningful without the options. The student should not have to read options to find out what a question means. For example, a student reading the first item stem below would not know whether to respond with what the forms do, where to find them, or what.

What the item writer said:

Instructions for preparing AFTO Form 781.

What the item writer should have said:

Which technical order has instructions for preparing AFTO Form 781?

The student doesn't have to read the options to know what the second stem is asking.

Make sure items can stand alone out of context

A student may know just what an item refers to when the item is referenced to a specific lesson and appears in the text, in sequence with other items, but will the student know the implied reference if the item is out of context on a CE?

What the item writer said:

> The oil cooler blower is driven by the…

Out of context the stem is general. Does the oil cooler blower refer to ground equipment or to a blower in a helicopter? The student needs to know which type the author has in mind.

What the item writer should have said:

> The oil cooler blower on the H3 helicopter is driven by the…

The rewritten stem is specific, and the student no longer must guess which type of blower is under consideration. If, on the other hand, your course covers only one specific system or aircraft, you do not need to include that fact in each stem.

Make sure items are clear, brief, and direct

Put enough, but only enough, information in the stem for the student to be able to answer the question. Items having pronouns with doubtful antecedents, misplaced sentence elements, and words or phrases that can be misinterpreted are unfair to the student. In this example, the writer loaded the item stem with needless words and the stem ended up with a vague pronoun reference:

What the item writer said:

> A functional grouping of closely related Air Force positions on the basis of similarity of education, training, experience, and other abilities required to perform them is referred to as…

What the item writer should have said:

> A grouping of tasks that require similar qualifications of airmen who do the tasks is known as…

But overemphasis on brevity may lead to the omission of needed information:

What the item writer said:

> To solve for voltage, what must you do to the original formula?

What the item writer should have said:

> To solve for voltage, what must you do to the original formula for Ohm’s law?

Make distractors plausible

Distractors that are obviously wrong narrow the choices and increase the chances of correct guesses.

For instance, in this item, the distractor “balloons” is not believable and the student can rule it out at once:

What the item writer said:

> The sensing elements for the vertical reference platform of the automated astrocompass are
> a. accelerometers.
> b. bubble units.
> c. pendulums.
> d. balloons.

What the item writer should have said:

The sensing elements for the vertical reference platform of the automated astrocompass are
a. accelerometers.
b. bubble units.
c. pendulums.
d. synchros.

Make the options parallel in category, structure, and length

If you fail to do so, differences other than the correctness or incorrectness of the options may give away the correct response. Item writers tend to make correct responses *longer* than incorrect ones. In this item, the correct option, *d,* stands out by its length alone:

What the item writer said:

The *best* reason for *not* writing a program using absolute addresses is that it
a. takes too long to write the program.
b. takes too long to debug the program.
c. is too hard for a new programmer to write.
d. would cause complications if it became necessary to add other instructions somewhere in the midst of the program sequence.

What the item writer should have said:

The *best* reason for *not* writing a program using absolute addresses is that it
a. takes too long to write the program.
b. takes too long to debug the program.
c. is too hard for a new programmer to write.
d. is hard to add new instructions to the program.

Italicize key words

If the stem has such words as *best, most, least, not, except,* or *never,* italicize them. If other words in the stem are critical to student understanding, italicize them also.

Use negative items (not, except) sparingly

Negatives in the stem can be confusing. Note that in the above sample items, the negative phrasing causes you to read more carefully to be sure you understand the question.

Make options grammatically consistent with the stem

Be grammatically consistent throughout the stem and its options. For example, *a* or *an* as the last word in a stem can betray the right choice.

What the item writer said:

A group of tasks requiring similar qualifications of airmen is known as an
a. career field.
b. manning document.
c. Air Force specialty.
d. specialty description.

What the item writer should have said:

A group of tasks requiring similar qualifications of airmen is known as
a. a career field.
b. a manning document.
c. an Air Force specialty.
d. a specialty description.

Make sure items have only one correct answer

Often, only one answer is text-supported, but other options *could* be correct. For example:

Good counseling helps develop
a. good communication.
b. community involvement.
c. better working conditions.
d. understanding and respect for others.

Do not repeat key words from stem to options

A key word in both the stem and an option can reveal the correct answer. In this item the word *task* gives away the correct option:

What the item writer said:

An "a" proficiency code on an STS item says a student should be able to name parts, tools, and simple facts about a task. The letter *a* is on the proficiency code key under the heading of
a. subject knowledge.
b. task knowledge.
c. performance.
d. principles.

What the item writer should have said:

An "a" proficiency code on an STS item says a student should be able to name parts, tools, and simple facts about a job. The letter *a* is on the proficiency code key under the heading of
a. subject knowledge.
b. task knowledge.
c. performance.
d. principles.

Avoid "all of the above" and "none of the above"

Use catchall options with caution. Students generally assume (correctly) that the catchall option is the correct answer.

Do not use such options as "both a and c" and "neither a nor c"

An item having such options tends to test reading skills rather than specialty knowledge.

Do not use contractions in item stems or options

If you hide a negative word in a contraction, the student may overlook the negative and answer the question incorrectly.

Arrange numeric options in ascending or descending order

Students are used to having numbers ordered, from low to high or from high to low. It is a nuisance *not* to have them ordered.

What the item writer said:

The square root of 9409 is
a. 97.
b. 87.
c. 107.
d. 77.

What the item writer should have said:

The square root of 9409 is	***OR:***	The square root of 9409 is
a. 77.		a. 107.
b. 87.		b. 97.
c. 97.		c. 87.
d. 107.		d. 77.

Spell out abbreviations and acronyms

Spell out abbreviations and acronyms in *each* U0 item the *first* time you use them.

Give form and publication titles

Give form and publication titles in *each* U0 item the *first* time you use them.

Reuse proven items

Review existing items and verify that each item addresses the topical statement. Replace items that fail to do so. Use the item analyses to check the performance of existing CE items. Improve or replace weak items. Often you can make a weak item stronger by rewording the stem or changing an option. Sometimes, you need to rewrite the lesson text to support the item better.

NOTE: Before using an old version of a URE or CE as a source for test items, check to see whether any of the items have been deleted from the old test. If items *have been deleted*, find out why and make adjustments, as needed.

Adhere to punctuation conventions

How must you punctuate item stems?

Stem Type	Punctuation Type
Question	Punctuate a question with a question mark. Capitalize the first word of each option.
Imperative	Use a period at the end of an imperative statement. Capitalize the first word of each option.
Open stem	Omit punctuation at the end of an open-stem question (incomplete statement). Do *not* capitalize the first word of an option unless that word is a proper noun.

What are the rules for typing options?

Punctuation	Put a period at the end of each option. This is critical.
Returns	Put a hard return at the end of each option. This is particularly important after the “d” option.

Send enough items—but not too many

Send a minimum of two items per lesson—two items is a bare minimum. Send more items per lesson if a course is short, if a lesson is long, or if information is concentrated.

WARNING: Never send fewer than two items per lesson. Never send fewer than 75 items per volume. Sending too few items can cause us to stop production on your project.

Send no more than 200 items for the entire volume. We can use no more than 200 items for the URE and two CEs, so concentrate on giving us the best 200 items possible.

Checklist for writing items

You may want to copy the checklist on the next page to keep by you when you're writing multiple-choice items. The checklist is based on the guidelines just discussed.

Checklist for Writing Multiple-Choice Items	
	Is this item supported by lesson material—not on information in introductions?
	Does this item relate directly to the learning objective expressed in the topical statement?
	Is the text support clear?
	Is this item the next logical question, given the text support?
	Does the stem state a central problem?
	Can this item stand on its own in a course examination?
	Is the item clear, brief, and direct?
	Are the distractors convincing?
	Are the options parallel in category, structure, and length?
	Did I italicize key words (*best, most, least, not, except, never,* etc.) in the stem?
	Did I state the problem in a positive way, avoiding confusing negatives?
	Is each option grammatically consistent with the stem?
	Is only one option a correct response?
	Have I made sure not to repeat key words from the stem to an option?
	Did I avoid using "all of the above" and "none of the above"?
	Did I avoid using "both a and c" and "both c and d"?
	Did I avoid using contractions?
	Did I arrange numeric options in order?
	If this item is from an old URE or CE, is it a good item?
	Is the stem punctuated properly?
	Is there a period at the end of each option?
	Are there at least two items per lesson and at least 75 items for the volume?
	Are there 200 or fewer items for the entire volume?

Developing the U0.DOC file

You must send your multiple-choice items in a test item bank. (See appendix page A–13.) The file name for the bank is U0.DOC (that is, U-ZERO.DOC). The U0.DOC is not based on an AFIADL template. It is a straight Word file. The list given here presents the mechanics of developing the test item bank:

1. Create a new file. Name the file U0.DOC. This file can have formulas created in Microsoft Equation Editor.
2. On the first line, type the course number and volume, such as 2A177–01.
3. On the next line, type topicid, the first topical statement number, and a period. Use uppercase or lowercase, but use zeros for numerals, not capital O's.

4. On the next line, type beginitem ans=a (b, c, or d) endid.
5. On the next line, type or copy from another file the item stem and the four options. Make sure that Word's automatic numbering feature is turned OFF.
6. On the next line, type enditem.
7. Leave the next line blank.
8. Repeat appropriate steps above for the remaining test item bank questions.
9. You may type comments or instructions in between "enditem" and "beginitem" using brackets ([[[), as in the examples that follow. Leave one blank line.

The beginning of the test item bank (U0.DOC) should look something like the example on the next page:

```
2A177–01
topicid001.
beginitem ans=b endid
Which of these is not a benefit of stock funding depot-level reparables (DLR)?
a. Reductions in levels of required inventory.
b. Increased carcass return rates.
c. Decreased carcass return rates.
d. Increased material availability.
enditem

[[[use next item on CE
beginitem ans=c import=i endid
Under the depot-level reparables (DLR) stock fund concept, what price
is charged to your unit funds when a serviceable asset is issued from
supply?
a. Standard price.
b. Carcass price.
c. Exchange price.
d. None; there is no charge.
enditem

topicid002.
beginitem ans=d endid
Under the depot-level reparables (DLR) stock fund concept, what price
is charged to your unit funds when an unserviceable asset is issued
from supply?
a. Standard price.
b. Carcass price.
c. Exchange price.
d. None; there is no charge.
enditem
```

Showing the importance of items (optional)

If you wish, you may show the relative importance of each test item in its parameter line:

- Import=I for an important item.
- Import=C for a critical item.

Routine

Do *not* mark routine items in your U0.DOC file. Items not marked "C" or "I" will default to "R." Here are some examples of routine items:

- Responsibilities of other people and organizations.
- Most definitions.

- Very general or very specific information about a topic.
- Operation of something when the student is not directly responsible for procedure, process, or maintenance.

Important

This designation is reserved for information, concepts, procedures, or processes that are important for the student to know and that relate in a *direct* way to the student's job.

Example:

```
beginitem ans=a import=i endid
```

Critical

This designation is reserved for procedures or processes that, if not followed, could cause serious damage or harm to equipment, property (like software), or people. It's probably something you want the student to commit to memory. A "critical" item is so important that you want to assure coverage in the self-test questions, URE, and CE. Use this designation *very* rarely.

Example:

```
beginitem ans=b import=c endid
```

Sending formulas, graphics, or tables for the URE or CE

You may find formulas, graphics, and tables to be helpful in testing. Be sure you know how to present them.

Formulas

Use your keyboard to write a *simple* formula ($a^2 + b^2 = c^2$) into the stem or an option of an item in the U0.DOC file. Use Microsoft Equation Editor to insert more complicated formulas directly into the U0.DOC file. You can type the simpler equations without the Equation Editor and use hard spaces and tabs to hold things together.

Graphics

You may be able to use your keyboard to create simple illustrations for use in a stem or option in your U0.DOC file—angles, for instance: ∠.

You must not insert the complicated illustrations we call graphics into your U0.DOC file. Instead, send them as you would normally (hard copy, electronic copy, reference in the legend). If you want to use a graphic in the URE that you used in the text, simply refer the student to the applicable figure number in the stem of the question. We will not duplicate a figure that appeared in the text in the URE portion of a unit. If you also want that item to be used in the CE, so indicate by putting instructions in brackets *between* the items in the U0.DOC file. The ISS will then link or import the graphic in the proper place on the CE.

Example:

```
enditem

[[[use F1-4 with next item
beginitem ans=a endid
In figure 1-4, the bias for transistor Q1 is provided by
a. R1.
b. C1.
c. L2.
d. T3.
enditem
```

To use a graphic that you did *not* use in the text, send a hard copy and an electronic copy, and give a reference in the legend using T–1 for the first graphic, T–2 for the second, and so forth.

Example:

```
enditem

[[[next item URE only (or CE only)
[[[use T-1 with this item
beginitem ans=a import=i endid
In figure T-1, the bias path for transistor Q2 is traced from
a. ground through C1 and R1.
b. Vcc through L1 to ground.
c. Q1 to R2 and C2.
d. Q2 to ground.
enditem
```

Tables

Do not insert any tables (whether developed by the graphics shop or by you in Word) into your U0.DOC file. If you refer to a table from the text in a URE item, put a note in the text beside the legend. This alerts the ISS not to delete the figure reference.

Figure 1–5. IMSC mode switch versus ADI displays. [[[used in URE

If you send new tables for the URE, give each table a test figure number (T–1, T–2, etc.), even if you key it in yourself in a separate Word file.

Marking text support of items

To identify text support of your multiple-choice item, put the hidden word TEST in your Word file immediately *after* the end of the sentence or sentences having the support. To do this, use the Test Mark button on the toolbar called Test Related Stuff to put in TEST automatically.

To use the menu, click on Format, Font, and select Hidden before you type in the word TEST in all caps. When you finish typing TEST, type a space, and deselect the hidden font using the same drop-down menu. To see hidden text, click on the Show/Hide button (¶) on the Standard toolbar.

To use keyboard shortcuts to invoke a hidden font, press Ctrl+Shift+H, type in TEST, and press Ctrl+Shift+H again to turn off the hidden font. Again, to confirm you have typed the hidden text correctly, you may click on the Show/Hide button (¶) on the Standard toolbar.

Alternate method of marking text support

This is *not* a requirement. Generally, the marking procedure outlined above will meet your needs. This alternative merely adds the use of highlighting color and a three-digit number to correlate each item in the U0.DOC file to its support in the unit file.

To use this method, you can adapt the procedures just given or make three shortcut buttons for your toolbar. The buttons you will need are for the Hidden command, the command for the Color to highlight your test references, and the Black Color command. Use the Black Color button to change to black type after using the Highlight Color button. To build your toolbar buttons, follow these steps:

1. Click on Tools on the menu bar.
2. Click on Customize.
3. Click on the Toolbars tab.
4. Click on All Commands in the Categories window.
5. In the Commands window, click on Color.

6. In the lower right corner under Color, click on Black.
7. Move back to the Color command. Click, hold, and drag the command (using your mouse) to the toolbar area where you want it; then release the mouse button.
8. Click on Edit on the Custom Button menu.
9. Click on the black color, and use the left mouse button to color in the picture area or draw a pattern.
10. When completed, click on OK.
11. Do steps 5 through 9 for the highlight color you've chosen. (Pick a color—other than black, obviously—that will show up well.)
12. Move through the Commands window and click on the Hidden command; now click, hold, and drag the command (using your mouse) to the toolbar area where you want it; then release the mouse button.
13. Click on a premade button and click on Assign, or click on Edit and make a button. (Most people use the fifth button in the third row of the premade buttons.)
14. When completed, click on Close.

Now you're ready to go to work. First click on the Show/Hide button (¶) on the toolbar so that you can verify your entries as you work. Type a three-digit number in hidden text at the end of the stem of each item in the U0.DOC file. Start with the first test item in lesson number 001 and continue to 999, as needed. Type TEST and the proper three-digit number in hidden text at the end of the sentence or sentences containing the correct answer to each item in the unit file. (Use the Find function in the Edit drop-down menu to look up the text support for each test item.) If the correct answer is spread out over two or more places in the lesson, type TEST and the number in hidden text in each place.

When you're entering the text support marker in the unit file, click on the Hidden button and then the Highlight Color button, and type TEST and the three-digit number. You will have to click on these two buttons for each entry you make, for your computer will automatically return to normal editing mode when you click in another position in the file. (If you put two markers after the same sentence, you will not have to click the Hidden and Highlight Color buttons for the second marker. The second marker will pick up the attributes of the first one.) If you must insert additional text *immediately after* a highlighted three-digit number, first click on the Hidden button and the Black Color button to return to normal editing mode. Otherwise, the added text will be highlighted.

If you click on the Highlight Color button or Black Color button without first clicking on the Hidden button, you will insert characters into the unhidden text. If you click on the Hidden button without then clicking on the Highlight Color button, you will insert hidden black characters. As a fail-safe, you may choose to page through your U0.DOC and unit files in normal (unhidden) mode after you are through inserting markers.

How will your counterparts at the Institute use this method to verify text support of your test items? First, they will open the unit file and click on the Show/Hide button (¶). Then, to find text support for a specific item, they will type its three-digit number in the Find What window. To find text support for all of the items, one after the other, they will go to the top of the file, type TEST in the Find What window, and click on Find Next repeatedly. Each time the computer finds TEST, they can compare the text support against the test item identified by the corresponding three-digit number.

Other options in marking text support

If you want to identify each item with a three-digit code but don't want to go to much trouble to do it, just leave off the color business:
(1) give each item its own three-digit number in hidden text at the end of the stem, and (2) type TEST and the same three-digit number in hidden text at the end of the sentence or sentences supporting the item. This way, you lose the high visibility of the markers and you can't find them so quickly just scrolling through the file, but the Find function in the Edit drop-down menu gets you unerringly to the next hidden TEST anyway.

If you use this alternate method and want to highlight the marker, you may find it easier to enter TEST plus the three-digit number in each appropriate place in the text, use the Find function to locate each TEST, and apply the Highlight Color by clicking the Highlight button. (The Find function highlights TEST.) Black numerals following a highlighted TEST are easy to read, so you will not really need to highlight them.

Here's a shortcut for inserting a hidden, highlighted TEST: (1) Click the Hidden button (or press Ctrl+Shift+H), (2) click the Highlight Color button, (3) type TEST, (4) highlight (double-click on) TEST, (5) copy TEST (Ctrl+C if you don't have a Copy button), and (6) paste in TEST each time you want to mark text support for an item (Ctrl+V if you don't have a Paste button). This shortcut also works for pasting in a black TEST (or anything else), of course.

No matter which text support identification method you use, put each completed unit file into normal (unhidden) mode and search for TEST. If you have failed to hide a marker, the search function will highlight it for you. All you have to do to hide it is to click the Hidden button or press Ctrl+Shift+H. If you have not failed to hide any markers, your computer will search a file in seconds. Visually scanning the U0.DOC file in normal (unhidden) mode should let you find any errant markers there.

5–2. Writing Self-Test Questions and Answers

Once you develop topical statements and multiple-choice items, you develop self-test questions that exhaust the pertinent material in each lesson. Sequence self-test questions in the same order in which the text supports them.

Self-test questions may be short-answer, matching, or problem/situation questions. They should help students reach the desired level of proficiency. Some questions may deal with lower proficiency levels if they enable students to reach the target level. You may choose to use figures with your self-test questions. The example shown on the next page shows the relationship of topical statements, multiple-choice items, and self-test questions.

Topical statement:	719. Converting binary and decimal numbers
Multiple-choice item stem:	What is the binary equivalent of $634_{(10)}$?
Self-test questions:	1. How can you convert mixed decimal numbers to the equivalent binary form? 2. What method should you use to convert decimal fractional numbers to binary fractional numbers? What number should you use as the multiplier? 3. What is the decimal equivalent of 10011010? 4. What is the binary equivalent of 1992?

Acceptable self-test question formats

We use only these types of self-test questions:

- Short-answer.
- Matching.
- Problem/situation.

Do *not* send self-test questions in completion (fill-in-the-blank) or true-false format, or in any variation of these formats. Multiple-choice items are reserved for the URE and CE.

Place self-test questions at the end of each section—nowhere else.

Short-answer

A short-answer question asks students to recall facts, ideas, or principles; make comparisons; define terms; or give examples. Limit answers to a word, a brief list, a phrase, or a short statement. When you write short-answer questions:

- Make each question clear and concise.
- Use the active voice.
- Address *essential* information only.
- Avoid contractions.

Suppose you want to write a short-answer question on AC and DC motors used to drive pumps. You want students to compare the two types. Instead of asking a general, open-ended question, define the *type* of response you get by asking for a certain type of comparison.

Do not ask this question:

What's the difference between the AC motor and the DC motor as power sources for pumps?

Limit the response necessary by asking this:

What are the advantages of using an AC motor for driving pumps?

The first question is too broad. Good students can write at length on it. The second question tells the students *exactly* where to begin and where to stop. It sets limits to the response. Of course, there are many types of short-answer questions. Here are some examples of short-answer questions for a specified topical statement:

010. Purpose and procedures of SORTS reporting

1. What is the purpose of the SORTS reports?
2. Within what time period must additions, changes, and deletions to SORTS data be reported?
3. What is the primary means of reporting SORTS information to the JCS?

Matching

Use matching questions to show comparison, identification, or definition of basic facts. Matching questions have two columns of related topics. Students match items from column B that best relate to items listed in column A. Apply these rules when you write matching items:

- Give simple, direct instructions. Always state that options may be used once, more than once, or not at all.
- Use homogeneous item groupings.
- Put longer items in column A; put shorter items in column B.
- Use parallel syntax. (Any item in column A should seem to go with any item in column B.)

- Use plausible distractors, but do not try to trick students.
- Use the buttons on the special matching toolbar (AFIADL's Matching Question Tools) to format matching exercises.
- Include not more than seven items in either column A or B. (You can make another matching question to cover other information.)

The example here is a good matching question. It addresses the topical statement by asking students to identify the functions of push buttons and indicators. You can use the special toolbar for matching questions for formatting most of your matching questions.

211. Functions of paper tape reader push buttons and indicators

1. Match each push button and indicator in column B with its function in column A. Items in column B may be used once, more than once, or not at all.

Column A	Column B
____ (1) Stops the paper tape reader. **Matching Col A style**	a. Power. **Matching Col B style**
____ (2) Connects power to the unit.	b. Operate.
____ (3) Permits an operator to load tape.	c. Load.
____ (4) Engages the rewind operation.	d. Forward.
____ (5) Glows when the tape ends.	e. Rewind.
____ (6) Allows continued operation.	f. Backspace.
	g. Halt.

To format the answers to a matching exercise, use the Answer style for the first line of the answer and the Subordinate Answer style for subsequent lines. For example:

211 **STQLO style**

1. (1) a. **Answers style**
   (2) b. **Subordinate Answer style**

Problem/situation

Use problem/situation questions to measure students' understanding of principles or ability to solve problems or apply principles. These questions go beyond recall or recognition. They require students to consider various factors and arrive at solutions—whether they deal with mathematical or simulated real-life situations.

When you provide a situation that asks students to draw from everything they learned in the lesson, you help them apply their knowledge and show they understand the information as a whole. Another advantage of the problem/situation question is that you can measure learning in several ways. You can change the variables to alter situations so that the students can make decisions about the same facts by evaluating different conditions. You can create problems to cover such areas as mathematics, troubleshooting, and planning. This kind of question is effective, efficient, and flexible. Use these guidelines to develop problems:

- Make the problem realistic, practical, and applicable to your career field.
- Be sure the information is accurate.
- Give enough data for students to find a solution.
- Do not introduce unnecessary data as distractors.

Here is a math problem in a self-test question:

412. Converting decimal numbers to binary, octal, and hexadecimal notations

1. Convert these decimal numbers to equivalent binary, octal, and hexadecimal numbers.

Decimal	Binary	Octal	Hexadecimal
a. 80			
b. 132			
c. 144			
d. 256			

The answer to this self-test question should be the same table *completed*.

The mathematical problem, in particular, forces students to do operations accurately and in a definite sequence. The simplest form of mathematical problem provides a body of data and requires the direct application of one or more related formulas. For example, look at these two sets of self-test questions:

613. Estimating labor for a simple plaster construction job

1. How many labor hours are needed to plaster a 12-by-12-foot room having walls 8 feet high and a door and window allowance of 87 feet?
2. How long should two people take to apply 1,000 square feet of stucco to a concrete masonry wall?

814. Statistically analyzing test scores

1. You have given a course examination to your students. When you tabulate their scores, you get this frequency distribution:

Scores	Airmen	Determine:
60–69	4	(1) N.
70–79	7	(2) Mode.
80–89	8	(3) Median.
90–100	5	(4) N/2.

   Solve for the elements listed in the "Determine" column of this table.

These examples ask questions students can solve by using formulas or applying principles. They are, in a sense, cut and dried. Manipulating a few simple formulas cannot solve most problems, including those involving mathematics. They are questions that simulate real life and pose problems for which students must consider possible solutions, selecting one they think is best. Such real-life items adapt particularly well to troubleshooting and planning exercises.

We are using the term *troubleshooting* to include equipment, organizations, and people. Writing good troubleshooting and planning questions may be harder than writing other types, but here are some tips to make your task simpler and your results rewarding:

- Make the situation realistic.
- Make it relevant to the principles or ideas developed in the text.
- Make it new. Do not repeat situations discussed in the text.
- Be clear and specific.
- Make sure the situation gives a good basis for the solution, but limit it so that it does not pose too many problems.

- Develop several problems for each situation.
- Make each problem independent of the solution to any other problem.

The number of problems and the difficulty of the material determine the amount of information you give. Situation questions are based on actual or hypothetical circumstances or data. They can be simple or complex and can provide the basis for one or more problems.

Problem/situation questions have many advantages in our courses. They approach real life more closely than other types of questions and help you put the students in the job. Items that force students to use the text, the figures, and reasoning ability make good troubleshooting exercises. For example:

> **015. Finding the cause and prescribing the remedy for malfunctions observed in an operational test of propellers on a multiengine aircraft**
>
> *Situation:* You are conducting an operational test of the…propellers on a multiengine aircraft. You find these conditions: (1) oil leakage on the barrel halves of a propeller, (2) one propeller operates normally to the full increase rpm blade angle, but the blades do not go beyond low pitch during reverse operation, and (3) one propeller does not stabilize at the required minimum rpm.
>
> 1. What unit could permit leakage on the barrel halves of the propeller?
> 2. For condition 2, what are the possible sources of trouble? Which are most likely?
> 3. For condition 3, if you find the trouble to be in the stepmotor head, what should you do to correct the trouble?

Answers to self-test questions

Answers are essential to the teaching of self-test questions. Students need an easy way to check their progress and to find out what they need to restudy. Students get quick feedback and reinforcement when they check their responses with the answers.

Content

Writing answers demands as much care as writing questions. Do not ask questions you cannot answer from the information in a single lesson. Just as your questions should have the same meaning for all students, so should your answers. If possible, have someone who knows your subject check your questions and answers. Follow these rules when you develop answers:

- Don’t repeat the question in the answer. If you are having the student complete a table, you must put the completed table in the answer.
- Don’t introduce new information. All lesson information should appear in the text of the lesson itself.
- If the answer needs more information than is in the text, put the information in the text or rewrite the question.
- Answer each question fully.
- If there is a sequence of requirements in the question, answer in the same sequence.

Format

Put the answers to self-test questions at the end of each unit, just after the last set of self-test questions and just before the unit review exercises. Separate the answers to self-test questions from the rest of the unit by a solid line and a title, which you can insert by clicking on the AutoText button on the custom toolbar.

The format for the answers themselves makes checking the answer to any specific self-test question easy for the student. First, insert the lesson number (topical statement number) on a line by itself, with no period. Then, to format the lesson number, click on the STQLO style button on the custom toolbar. The answers themselves should have no styles other than the Answer style or the Subordinate Answer style applied.

A couple of examples may clarify the format rules. A self-test question may call for the student to respond with an answer having several parts.

For instance, if a self-test question asks this:

216. Movement

1. State the three rules of movement.

Format the answer like this:

216

1. (1) Movement must be motivated.
   (2) Movement begets movement.
   (3) Movement must be believable.

Another example of a need for a multipart answer is for a self-test question that has several parts to which a student must respond. If a self-test question is formatted like this:

317. Notification

6. Explain each of these exceptions to hazardous materials emergency notification requirements:
   a. On-base.
   b. Permitted and in compliance.
   c. Excluded.

Format the answers like this:

317

6. a. Any release resulting in exposure to.…
   b. Any discharge, emission, or other.…
   c. Any other release excluded under.…

See appendix page A–8 for more examples of answer formats.

5–3. Maintaining and Evaluating Course Examinations

The CE is a tool to measure student achievement. Studying the text, self-test questions, and the URE prepares students for the CE.

Keep copies of CEs (hard copies and disks), CE item analyses, and CE answer keys in locked storage. Do *not* let unauthorized people inspect or review CEs. Annually, inventory all CEs, item analyses, and answer keys. Inventory them again when you leave your job. Show the date each document was received, the course number and form number of the document, and the type and date of disposition of any CEs removed from your holdings. Keep data on such removed CE documents for 1 year past the date of disposition. As CE materials become obsolete, shred paper documents and erase disks and hard drives.

Item analysis

A statistical analysis of each examination, an *item analysis*, helps us judge both student performance and individual items on the examination.

The Institute's computer scores answer sheets and collects data on performance. After the computer has processed the answer sheets from the first 51 students who take a new or revised edition of a CE, it produces an item analysis. An ISS uses the item analysis to identify possible faulty items. (The ISS sends you a copy of the item analysis for your action.) The computer produces a second analysis after accumulating 123 responses. The second product give a more accurate analysis of how the examination is functioning and shows the effect of changes or deletions made after the 51 sample.

The item analysis is valuable. You need to understand it because you will get one for most CEs, with our comments, for your review and evaluation. You must use the item analysis to decide when an item has weak text support, a miskey, two correct answers, or other problems. Of course, you must use item analyses of CEs to evaluate items before you reuse them.

Summary of statistics

Here are explanations of the summary entries on an item analysis. Study these paragraphs, keeping in mind that the format for this summary may change from the one found on the item analyses in your files. You will be most concerned with the number in sample (nr in sample), number of items (nr items), average ease (avg ease), average discrimination index (avg item disc), number of failures (nr failures), and failure rate.

Nr in sample—the number of students, either 51 or 123, who took the examination. These particular numbers are used to calculate the discrimination index because they are divisible by 3. Scores from three subgroups of students (subgroups based on overall CE performance) are used in calculating the discrimination index.

Nr items—the total of items scored on the CE at the time of the computer printout. The number may be the original number or a reduced number because of deletions.

Reliability index—a statistical estimate of how consistent results should be on successive administrations of the CE. These are reliability guidelines:

- Poor: less than 79.
- Good: 80–89.
- Excellent: 90 and above.

Avg item disc—the average of the individual item discriminations. It is a measure of how well the examination discriminated between the better and poorer students. A high positive discrimination index shows many or all of the students in the highest subgroup answered the items correctly, whereas many or all of the lowest subgroup did not. Therefore, the item discriminates knowing students from unknowing students.

Mean—the average number of correct responses for all students who took that form of the CE.

Avg item ease—the average item ease is simply a statistical percentage identifying the overall difficulty of the items in the test for a specific group of students. This statistical measure is defined in terms of the relative frequency with which those taking the test choose the correct response.

Standard deviation—a measure of the variability of clustering of the raw scores. If there are many scores at both the high and low extremes of the range, the standard deviation will be higher than when most of the scores bunch together near the mean.

Standard error of measurement—a statistical indication of the amount of variation to be expected in the test scores (if the same students took this test again). This estimate, derived from the test reliability and the standard deviation, shows the range in which a student's true score probably falls. For example, if a student achieved a raw score of 97 correct answers and the standard error of measurement was ±5, the student's true score probably is in the range of 92–102. Obviously, the lower the standard error of measurement is, the better.

Pass/fail point—the minimum number of items the student must answer correctly to pass the course. A score of 65 percent correct is passing for most CEs.

Range—the spread of scores from lowest to highest. The range is also reflected in the frequency distribution of the scores.

Nr failures—the number of students in the sample who failed *this form* of the CE. Students who fail one form of a CE may take another form. Students who fail both fail the course.

Failure rate—percentage of students in the sample that scored less than 65 percent on *this edition* of the examination. Edition failure rates are, of course, much higher than *course* failure rates, since each student may take another edition of the examination if he or she fails the first time. If the fail rate is higher than 35 percent, there is a problem—with the examination, with the presentation of the subject matter in the text, or with something else.

Statistical analysis of each test question

The guidance here should help you to read the individual item statistics. Again, the format for item analysis may change, but the basic statistical measures will remain.

When looking at your item statistics report, there are several headings that you need to be familiar with when performing an item analysis:

- **EDT CDE** identifies the edit code of the test the students took.
- **? NBR** is the number of the CE item (test question number).
- **ITEM EASE** represents the percentage of students who chose the alleged correct response. It is an indication of how easy a question was for the group taking the test. Optimal difficulty level for an item is 50 percent for maximum possible discrimination between high and low achievers. By looking at items that have an ease index lower than .50, you can frequently spot miskeyed answers and items that are not explained well in the CDC text.
- **ITEM DISC** measures the ability of an item (question) to distinguish between lower and upper scoring students taking the test. Ideally, all correct responses discriminate positively (+) and all incorrect options discriminate negatively (–). *The number in this column will always mirror the keyed correct response*.
- **(A) (B) (C) (D) CNT** is the total number of students taking the test that selected response (A), (B), (C), or (D).
- **(A) (B) (C) (D) DISC** shows the discrimination index for each response. If the upper third of a group of students choose a response and the lower third does not, the discrimination index is high and positive. This is fine if that response is the correct answer. The maximum possible discrimination index is +1, and the minimum is –1; but these limits are almost never reached.
- **COR ANS** identifies the designated correct answer.

It is impossible for a very easy item (EI above 90%) and an item of great difficulty (EI below 20%) to have a high discrimination index. If all students answer an item correctly (100 percent ease), or if they all miss it (0 percent ease), the item has no discriminating power, but this fact, in itself, does not indicate a "bad" item. If the item addresses an important safety practice, you may wish all students to answer it correctly; your test item may serve as reinforcement of essential information. An item with 0 percent ease may be fine, but simply miskeyed.

In the book, *Essentials of Educational Measurement*, written by Robert Ebel and David Frisbie, a discrimination index for the correct response should be greater than .40. Remember, if the statistics show a very high or low ease index your discrimination index will be low. You should use the following table to evaluate how the discrimination index of the correct response differentiated between lower-scoring and higher-scoring students.

Discrimination Index Standard	
0.40 to 1.00	Very good item discrimination.
0.30 to 0.39	Item performing reasonably well.
0.20 to 0.29	Marginal item discrimination.
-1.00 to 0.19	Poor item discrimination.

Looking for items with an Ease Index under .50 and indices of discrimination (Discrimination Index) lower than .30, will usually suggest problems with the question or CDC text. Problems can range from miskeyed answers to ambiguous questions. You would normally correct miskeys and delete faulty items. Use analysis information to maintain your current CEs, but also use it in planning your next revision. If you plan to reuse items from your current CEs, check the ease and discrimination index for each item. Weed out or improve items that are too easy or too hard, items with weak distractors, and items flawed in other ways.

Course author response to item analysis

When you get item analyses, read your team's comments. Your ISS normally highlights for you any items having one of these problem indicators:

- **Ease index under 50**. (Means question is quite difficult.)
- **Low or negative item discrimination**. (Low achievers on the test chose the correct answer, while students who did better on the test selected a distractor.)

These unusual statistics suggest a problem, but they are indicators only. Do not delete or change an item based solely on statistics. Instead, examine the item, answer key, and CDC text. Be sure to check highlighted items for miskeys, ambiguous stems or options, and multiple correct answers. Check the text support to be sure each item is supported clearly and the support is not contradicted elsewhere in the text. Based on what you find in your research, decide what (if any) action to take.Do not delete an item just because it's difficult. If problems are noted, follow the chart below:

Delete the item	If text support is weak. Note the text deficiency so that you can rewrite it at revision time. If more than one option is correct. Note the conflict so that you can correct it at revision time. If there is no correct option. Note the deficiency for correction at revision time.
Correct the item	If there's a minor wording error in the stem.
Rekey the item	If the wrong option is keyed.
Delete, correct, or rekey URE items	If some bad CE items appear also on UREs.

The following table will give you an example of what your item statistics might look like:

Comp ID	Edit CDE	? NBR	Item Ease	Item Disc	A Cnt	A Disc	B Cnt	B Disc	C Cnt	C Disc	D Cnt	D Disc	Cor Ans
XXXXX	03	03	0.765	0.412	3	-0.118	1	-0.059	8	-0.235	39	0.412	D
XXXXX	03	29	0.941	0.176	48	0.176	0	0.000	2	-0.118	1	-0.059	A
XXXXX	03	31	0.196	0.039	11	-0.235	25	0.118	4	0.059	10	0.039	D
XXXXX	03	33	0.000	0.000	49	0.000	0	0.000	1	-0.059	1	0.059	B

Rekeying URE items and editing CE items

Depending on the information you find when you look at the tests and text, you may need to delete or rekey an item or send errata to the text. Maintaining CEs is a cooperative effort—we need your help. When you get student inquiries that affect test items, coordinate the action with your Curriculum team and follow up with written notification. We may call you about changes to test items based on student inquiries, item analyses, errata, and supplements. Because we are now using the print-on-demand process for CEs, we can edit CE files to correct misspellings and other minor errors. Time does not permit us to do major rewrites of items.

NOTE: You may make only very minor word changes to a URE or CE item in print. Tell us in writing if you find miskeyed items and how to rekey them. You may fax your letter to us at DSN 596–3208.

Rekeyed UREs will not be included in student course packages until the next prepackage is done at the warehouse. Only then is a new scoring key generated. The Institute periodically prepacks several months' supply of course materials, the exact number depending on projected enrollment.

Maintaining course examinations affected by errata and supplements

You know the impact of errata and supplements on your testing base since you initiate those actions. Along with any errata or supplement you send to the Institute, send instructions on changes to examinations. Unit 6 discusses this subject in detail.

To delete, rekey, or change an item, please fax the changes to the Institute.

***Fax instructions*:**	1. Type your request on letterhead. 2. Send ATTN: ECOC. 3. Use this fax #: DSN 596–3208. 4. Identify the exact examination to correct, including edit code. 5. Identify which CE items to delete and which to correct. 6. Identify any corresponding URE items to delete or correct.

Summary

As you write your multiple-choice items and self-test questions, remember these points:

- Multiple-choice items in the URE continue and extend the instructional process—not by introducing teaching points, but by increasing the scope and complexity of students' experience over the same information. These items highlight the key teaching points.
- Self-test questions should carry a major teaching load in our courses. These questions should identify for the students all the information they need to retain from a lesson segment. Self-test questions should exhaust the instruction.
- CEs measure the extent to which students have retained important teaching points. CEs also reinforce teaching through the feedback of results to the student.

When you maintain your course examinations, consider all the elements that may affect student performance. Problems in testing may come from the text questions or from the text.

Unit 6. Shipping List Changes, Supplements, and Revisions

ONCE YOUR COURSE writing job is complete, you may heave a heartfelt sigh of relief and plan to rest on your laurels, savoring the joy of accomplishment. Unfortunately, you cannot rest for long. Changes are being made constantly in the way the Air Force does things. New ideas, new equipment, improved methods, expanding technology—all produce changes that you must include in your course. This unit is your guide through the updating process.

Of course, you review all of your volumes and courses periodically to check for obsolescence and to send necessary changes to the Institute. Sometimes, you must add new material to a volume. At other times, pen-and-ink changes suffice. We use three methods of updating:

- Shipping list changes.
- Change supplements.
- Revisions.

Always consider the burden a student must bear, writing in pen-and-ink changes and making page replacements because of changes you make. If you have many extensive changes (such as replacing or adding lessons, figures, and even units throughout a volume), your Curriculum team may suggest you revise.

The same is true if you have pen-and-ink changes throughout a course to the extent that *more than an hour's posting time* is required of the average student. In fact, you and your team must consider several factors when choosing a method for updating. Here, you need to do the same kind of thinking we introduced in unit 1.

The strategy table in unit 1 offers general rules to help you decide which method to use. Those rules are based on the type and extent of the changes and the time it should take a student to post changes. Another factor to consider is how much material must be discarded if the changes are published.

6–1. Choosing Your Updating Strategy

Most of this *Guide* is devoted to revision of existing materials. Generally, when you must revise a course or a volume within a course, there is no doubt that revision is the way to go. If you have questions, call your team.

Which to use—shipping list change or change supplement

Deciding between updating with a shipping list change and updating with a change supplement may not be so simple. Because the time spent in choosing and planning your update can be the most productive time you will spend in the project, we give detailed guidance on it.

Questions to ask

The first things you need to know are:

- What sort of changes are you dealing?
- What is the impact on the course or volume?
- How soon do you need to get these corrections to the students?

Once you have this information, call the Curriculum Control Branch (AFIADL/ECOC), DSN 596–4258, to ask: What is the current prepack status (how many months of course packages do we have on the shelf)? When is the next prepack scheduled (when will the Institute put together some more course packages)? Is reprint of a volume or volumes of the course scheduled soon?

It is important to know about prepack and reprint because they affect when changes to material can be made available to the students. Normally, our courses are prepackaged and stocked to meet a projected 4½-month enrollment demand. Changes you make to any part of your course package must wait until the next prepack before they can be added to the package.

The timing of reprinting is also important. If you have extensive changes to a volume and ECOC is about to order a reprint, it is probably a good time to make the changes and coordinate with ECOC to get them in the reprint. Work with your team and ECOC to coordinate any reprints to coincide with changes you need to make.

Preliminary decisions

If your changes require adding or replacing material, including graphics, the usual strategy is to supplement. If your changes are basically short, *critical* items that need to get to students as soon as possible, use a shipping list change.

A shipping list change can also be used for deleting sentences or parts of sentences; inserting material into a sentence; replacing terms; correcting critical spelling errors; and deleting entire paragraphs, topical statements, sections, units (chapters), or volumes.

At this point, call your Curriculum team and discuss course specifics. Do not forget the potential impact of these events: changes in prescribing directives, equipment changes, forthcoming utilization and training workshops (U&TW) or STS revisions, and WAPS cycle needs.

First actions

Give the graphics shop any requirements for new or revised figures. Also double-check for accuracy and currency of any publications and forms you reference.

NOTE: You can find current and obsolete Air Force forms and publications at http://www.e-publishing.af.mil/. All other military forms and publications are found at their respective service sites.

When to send updated material

Though there can be no absolute rule on when to send updated material, get information to us in time to make the next prepack or in time for course activation. An activation supplement is one sent with the first mailing of the course.

When you know what changes you will send, call ECOC and ask when they must receive your package to make prepack or activation. Send in a revised course chart to let everyone know exactly what volume or volumes are affected by the pending change. Make sure your package reaches the Institute by the date ECOC gives you. In certain cases (discuss it with us), we may delay so that your changes can be included.

If your course is in production and is to be activated soon, and if you need to send changes that affect different volumes, follow these guidelines:

- Prepare changes for each volume as you receive the volume from the Institute.
- Tell your team and ECOC you will have activation changes for the course.
- Find the best way to include the changes.
- Ask ECOC when you must get the changes in.
- Hold changes until you have checked every volume except the terminal volume.
- When you get the terminal volume, quickly make any required changes and send them.

6–2. Preparing Shipping List Changes

You can issue a few simple changes on a shipping list. These usually involve only minor corrections such as pen-and-ink postings for simple errors that affect meaning. The next few pages give you a few guidelines for shipping list changes.

Correct only the errors that affect meaning

Shipping list changes must be *short* changes to correct errors that affect the meaning. They may include figure numbers, spelling, exercise/self-test question numbers, answer numbers, and so forth. If the error does *not* affect the meaning, leave it until you publish a supplement or revise the volume. Limit each insert to a sentence or two. (If you have many inserts, especially if each is a paragraph or more long, do a supplement.)

Identify where the change occurs

At the beginning of your change list, identify the course, volume number, and edition (print date). Then start your change listing. Pen-and-ink-change items must show students exactly *where* to change the text. For each item, identify the page number and the line number (from the top or from the bottom of the page). If the line count is from the bottom of the page, put the notation “fr bot” after the line number.

State the change exactly

When you must change a term, office symbol, publication name or number, or anything else more than 10 times in a volume, use a *general-change* statement rather than identifying each occurrence of the change.

The general-change statement applies through-out the volume or course (depending on the type of errata being sent). Make any general-change statements the *first* entries in your errata list after you identify the course, volume or volumes, and edition. The format for the general-change statement is:

Change ALL occurrences of “___” to “___.”

Identify specific deletions and inserts and state substitutions and changes so that students can understand them easily. Keep changes clear, specific, and exact. For most situations, this statement is the easiest for students:

Change “_____” to “_____”

Make each change fit the text

Make sure each change fits easily into the text without destroying continuity. Use transitions where they are needed, and recheck to be sure you have not deleted or changed something the students need.

Set up the pen-and-ink-change listing

Start by setting up column headings like those given on appendix page B–5: Page, Subject, Line(s), and Correction. Use current 00P&I template to do pen-and-ink changes.

Then enter all changes for the “page changes” list. Make changes only where meaning is affected, but keep a file copy of all errors you find, whether or not they affect the meaning of the material. The file copy may be valuable later when you revise a volume.

Check impact of changes on self-test questions

If you *delete* text for which there is a self-test question, be sure to *delete* the corresponding question and answer and include them in the pen-and-ink-change list. Or, if you *change* text, be sure to *change* any corresponding question and answer.

Check impact of changes on URE and CE items

When text changes or deletions affect URE and CE items, you must take corrective action. If there is no impact on the items, be sure to state clearly, "No URE or CE changes." Then we will know that you have checked for impact.

Because of differences in scoring methods and distribution, you must treat URE items and CE items differently. Enter URE items in one group and CE items in a separate group. (See appendix page B–3 for format requirements. See appendix page B–4 for your options for submitting CE changes.)

Correcting, deleting, and rekeying URE items

You can take these actions on URE items affected by changes:

- Make minor corrections (stem and options).
- Delete items.
- Rekey items.

Make minor corrections

If the problem is a spelling error (pi*l*ot tube instead of pi*t*ot tube, for example) or a minor omission, you can correct the mistake. Also, if you have a terminology change, replace the erroneous or changed term with the proper term.

Delete items

You must delete an item when:

1. You delete the supporting text, *or*
2. A text correction changes the meaning of the question and you cannot repair the question.

Rekey items

If you find a miskeyed URE item or an item for which the answer has changed because of a text change, *rekey* the item.

Rekeying and deleting CE items

Always identify the form number for CE items. You can take these actions on CE items affected by text changes:

- Rekey answers.
- Delete items.

Rekey answers

If your review shows the item was miskeyed, make a keying correction using the format shown on appendix page B–3.

Delete items

If text changes alter the information to which an item applies, you may have to delete the item. Because of the controls over printed tests, you may make only minor pen-and-ink changes. For example, you might change the name of aircraft or components to reflect a change in usage.

Send item deletion requests in writing

To delete a URE item or a CE item, please send the deletion request *in writing*. You may fax this letter to AFIADL/ECOC. Keep a record of these changes in your continuity file—you will not receive a new copy of the CE showing the deletions and changes.

AFIADL fax number: DSN 596–3208.

Mail text changes to the Institute

When you have completed your changes, double-check your work. Then prepare a cover letter identifying:

- Course number and name.
- Volume number(s) and name(s).
- Your:
  - Name.
  - Mailing address.
  - E-mail address.
  - DSN.

NOTE: When you submit errata for two or more separate courses at the same time, begin the errata for each course on a new page. This rule applies whether you are submitting hard copy or E-mail.

Send your letter, hard copies, and disk to

AFIADL/ECOC
50 South Turner Boulevard
Maxwell AFB, Gunter Annex AL 36118–5643

6–3. Preparing Supplements

Before you get to the fine points of supplement development, you need some basic information about types of supplements, coordinating and planning a supplement project, and getting copies of printed materials. This section covers these important aspects of supplement preparation, as well as procedural details.

Types of supplements

You may prepare two types of supplements for a course: supplementary-material supplements and change supplements. Before we give instructions on preparing them, we will differentiate between them.

Supplementary-material supplements

Supplementary-material supplements are usually sent with other course materials. These supplements consist of figures/graphics, maps, and foldouts. Occasionally, a supplement of this kind is sent to go with an entire course. If so, there is one important rule to follow: Send such a supplement with the *first* volume you send.

Then send a copy of it with each subsequent volume and say that the supplement is for use with the entire course. By following this rule, you ensure that the ISS for each volume can check any supplement references in that volume. In short, *do not* send such a supplement in with the *final* volume—it will be needed much earlier for review purposes.

This type of supplement can be issued along with a change supplement or by itself after course activation.

Change supplements

Change supplements are more complex than shipping list changes and supplementary-material supplements. They have new text material, new figures, or replacement pages, besides pen-and-ink postings. In change supplements, we tell students which volumes are involved, the type of changes, and how to post changes. The Institute publishes two types of change supplements: single-volume and multivolume. A supplement for a single volume carries the number for that volume (01, for example). A multivolume supplement has changes for two or more volumes of a course and is numbered 00.

There are two types of change supplements: those issued *before activation* and those issued *after*.

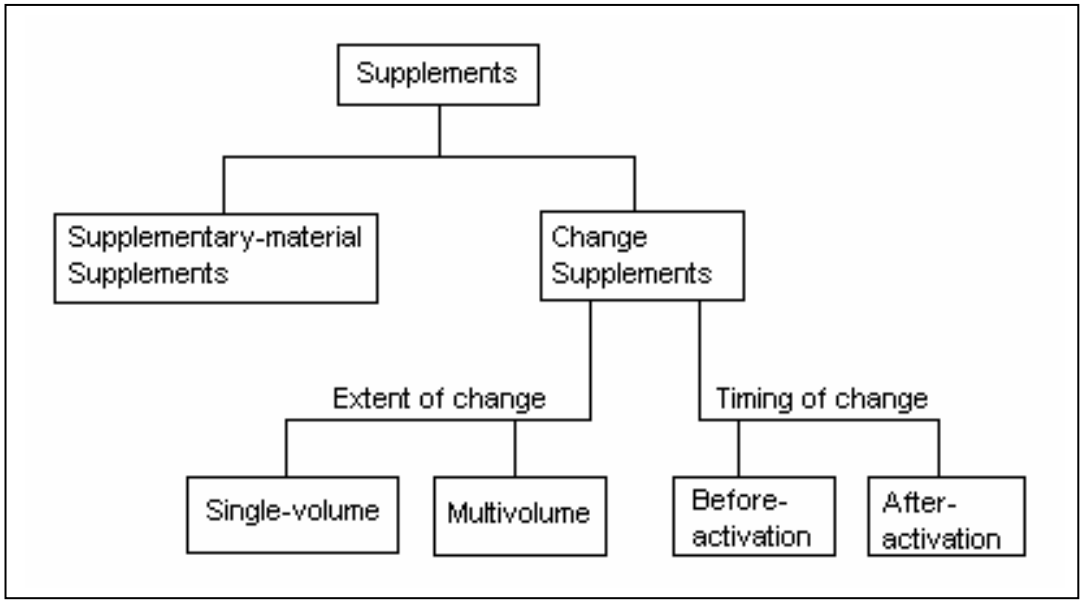
- A *before-activation* change supplement covers changes that must be made before a course is activated. It's called an activation supplement.
- An *after-activation* change supplement, obviously, is issued after a course is available. It's called a change supplement.

Coordinating and planning change supplements

If you are considering a supplement, coordinate with your Curriculum team before starting to process and send materials. Do not send changes piecemeal over weeks or months. Instead, hold the materials until you have all the changes for a volume or for all the volumes you want to include in the supplement. If you send a partial listing for changes to a volume, we might mistake it for your entire supplement and publish it as such.

Plan the entire project

Let us know from the start what you have in mind for updating an entire course—and, in view of the changes you plan, ask us whether to combine new changes with a published supplement, if there is one. Most often, combining an existing supplement and new changes is the right way to go.



Review the printed supplement carefully to see whether it has items that need updating, especially figures, information, or instructions that no longer apply. If you need new figures, order them as early as possible and send them with your supplement.

Check currency

Check the currency of everything in your volumes. Titles change, and publications are rescinded or superseded. Forms are especially hard, since they are updated frequently. Use the latest editions only. Find out whether you need to delete material from any existing supplements. Fit in any text changes from the shipping list so that they may be dropped from the new shipping list that will be prepared when your supplement is activated.

NOTE: You can find current and obsolete Air Force forms and publications at http://www.e-publishing.af.mil/. All other military forms and publications are found at their respective service sites.

Use updating strategies

Do not forget about the updating strategies discussed in unit 1. Before you start work on a supplement, be sure supplementing is the best method of updating for you. Remember that, in a particular course, you may find it best to revise some volumes and supplement others.

Getting materials together

Once you have coordinated with your team and have decided that a change supplement is the best strategy, you are ready to prepare your materials. You need two clean printed copies of your course, a red pen to mark changes, and a computer disk to record information.

Of course, you automatically get 5 copies of all new and revised volumes when they are first printed. But at updating time, you need copies of any active change supplements and shipping list changes to add them into the new supplement. (The Institute drops old supplements and shipping list changes after they are added into a new supplement or revision. Combining old supplements with a new supplement gives the added advantage of limiting the number of sources from which a student must post changes.)

Order at least *two* course packages. Send one marked copy of each volume with changes to the Institute and keep the other for your files.

Order the *complete* course packages from our warehouse. For questions, call DSN 596–4355. Email your request to AFIADL/WHOUSE.

Supplement-development procedures

Format the supplement in the final form and prepare replacement pages. You are responsible for the content of the supplement, and you must supply properly marked texts and standard files. Print out from the electronic *Guide* (or copy from your paper *Guide*) the summary of how to develop a change supplement and the coordination review checklist (appendix pages B–8 and B–9). Fill out the coordination review checklist as you work, and submit it with your supplement. The step-by-step process is given in more detail here:

Step 1

Collect changes for all volumes. Your changes will be of various types, from pen-and-ink entries to longer blocks that end up as replacement or additional pages. Include still-valid changes from any existing:

- Shipping list.
- Supplement.

Divide your changes for each volume into two types:

- Pen-and-ink changes.
- Inserts (replacement pages).

Step 2

Mark changes on the hard copy (printed volume). Simply go through the book and in red pen make:

- Changes.
- Deletions.
- Corrections.
- Additions.

Step 3

Convert your changes to Word files. Set up files for each volume using appropriate file names. See the table on page 6–10.

Pen-and-ink changes

When there are more than six pen-and-ink changes on a page in your marked-up book, that page will be replaced. Leave the changes marked and write "replace" in red in the top margin. Indicate these pages in the "page changes" part of the pen-and-ink-change list. The same is true for any page with an insert of more than one sentence. Pen-and-ink changes on those pages will be included on replacement pages including the new material. Don't include these changes in the pen-and-ink-change list.

Since both sides of any page you mark "replace" will be reprinted, mark changes on both sides, even if one side has fewer than six changes.

Name pen-and-ink-change files as appropriate; for example, V1PI.DOC, V2PI.DOC, and so on. Make these changes sequential with the text, and use the four-column format shown on appendix page B–5. Here are some guidelines:

1. State each change exactly.
2. Make each change as brief, clear, and specific as possible.
3. Make sure the change fits the text (that is, the context before and after).
4. Make sure you have not inadvertently changed something the student needs.
5. Use the Subject column sparingly, usually only for references to such items as figures, questions, and answers. Lesson numbers should rarely, if ever, appear alone in this column.
6. Count from either the top or the bottom of the page when identifying location of the change, depending on which will be easier for the student to follow.

If you have a pen-and-ink change that occurs more than 10 times in the volume—office symbol, job title, publication name or number, and so forth—use a general-change statement rather than listing the change each time it occurs.

The general-change statement applies throughout the volume or course (depending on the type of supplement). Again, the format for the general-change statement is—

Change ALL occurrences of "___" to "___."

When you use general-change statements, make them the *first entries* in your pen-and-ink-change listing, and then follow with individual pen-and-ink changes for the volume or volumes being supplemented.

Insert files (replacement pages)

Name insert files as appropriate; for example, V1INS.DOC, V2INS.DOC, and so on. Make these inserts sequential with the text. In the inserts:

- Note replacement/new figures.
- Make pen-and-ink changes on pages where figures are replaced.
- Make a legend list for any changed or inserted figures.

Clearly label inserts in this way:

Insert A for page 1–9
Insert B for page 1–9
Insert C for page 3–6
Insert D for page 4–22
etc.

Mark each insert location in red ink in the printed text (draw an arrow to the exact location) in this way:

Insert A here →
Insert B here →
etc.

Do not try to write in the insert information; just show its placement on the hard copy and put the text in the disk file. A correctly marked printed text is crucial to the success of this system.

Follow all rules carefully. The marked text tells us exactly where you want each insert or pen-and-ink change.

README.DOC file

Create this file for special instructions and comments and also for any URE and CE changes and deletions for a particular volume.

File-name conventions

Here is a table showing the files needed for a two-volume course, all volumes of which require both pen-and-ink changes and replacement pages (inserts).

File Name	Contents
V1PI.DOC	Volume 1 pen-and-ink changes
V2PI.DOC	Volume 2 pen-and-ink changes
V1INS.DOC	Volume 1 inserts
V2INS.DOC	Volume 2 inserts
README.DOC	Special instructions and URE and CE changes; use header for each volume.

Step 4

If you delete text, delete *all* related questions. Check:

- Self-test questions.
- Self-test answers.
- URE/CE items.

If there are no changes to URE or CE items, use this format to say so:

No changes to URE for 67250–02–0312 or to CEs 67250–900–01 and –02.

Adding new material

If you add text (parts of lessons, whole lessons, or units), prepare new:

- Multiple-choice items for coverage.
- Self-test questions.
- Self-test answers.

Place the *new* multiple-choice items in the README.DOC file; place the *new* self-test questions in a separate QUES.DOC file; and place the answers to *new* self-test questions in a separate ANS.DOC file.

Adding new lessons

Suppose you wish to include three new lessons between existing lessons 122 and 123. Here is how to identify them:

122a. (topical statement)
122b. (topical statement)
122c. (topical statement)

This procedure allows the material to be physically located at the appropriate point in the text. Of course, if you are adding new lessons at the end of the original text, you simply continue the existing number sequence. For example, if the last lesson in a volume is 141, lessons added after 141 are numbered 142, 143, 144, and so on, up to the volume limit of 199.

Adding new figures

Since figures are dual-numbered by unit, adding new figures rarely presents a problem. But some units have many figures. Suppose that you wish to add new material to a unit already having 30 figures and the new material includes three figures that are to fall between existing figures 1–3 and 1–4. To avoid renumbering the last 27 figures, number the new figures as 1–3a, 1–3b, and 1–3c. This is the only time to use this type of figure-number designation. Assign other figures, including continuation pages, their own incremental figure numbers.

Put the legend for each figure on a line just below the paragraph having the first text reference to the figure. Leave a blank line above the legend.

Adding self-test questions and answers

When you add or replace lessons, send questions and answers for the new material.

Adding multiple-choice items

For each new lesson added by a change supplement, send at least two items—preferably three or more for longer segments. These items cannot be used for the UREs. But if your supplement has significant changes covering important information, we may revise your CEs, adding or deleting some items. More commonly, these new items will not be used until the supplement is incorporated in your next course revision. Appendix page B–2 shows examples of replacement or new multiple-choice items.

Checking the effect of the supplement on URE and CE items

Your changes to, or deletions of, text material may affect your current UREs and CEs. You may identify by shipping list very minor changes to URE items, but be sure your changes do *not* give away answers.

If your text changes invalidate items, identify the items to us for deletion. If the supplement text changes do not affect current items, state in your letter of transmittal, “This supplement does *not* affect UREs or CEs.” (See appendix page B–6 for samples of appropriate statements.)

Checking all your materials

Compare your transmittal letter to the sample transmittal letter for a change supplement on appendix page B–6 to be sure you have met all the requirements. Using the supplement checklist on appendix page B–7, check all your materials to verify that you have completed all steps, that you have included all needed materials, and that everything is in order. Be sure all column designations and line counts in your files are correct. Be sure you used the *fr bot* notation for a line count from the bottom of a page.

Packaging and mailing

Stack your materials neatly, with the administrative materials on top, and package them securely. Mail your supplement to

AFIADL/ECOC
50 South Turner Boulevard
Maxwell AFB, Gunter Annex AL 36118–5643

6–4. Revising

We will not go into detail here, since the other units of this *Guide* have been about revising and writing course materials. We will stress a few important issues, though.

Call your Curriculum team

As you start to plan your revision, call an ISS from your Curriculum team and discuss strategy. Do not insist on a revision. If a volume does not need revision on its own merit (or lack of it), do not revise it—just file your AETC Form 107, Annual or Special Review Record, after the review.

EXCEPTION: If your course has been renumbered since its last revision, you cannot revise one volume under the new number and leave another volume of the same course in the field under its old number. You must revise the "good" volumes, too, even if your "revision" is no more than new front matter.

If your revision is limited to front matter and a few isolated areas in the book, (1) tell your team to alert its branch chief and (2) say so in your letter of transmittal. If you prevent us from processing an entire book, or most of one, that is in good shape, we will have more time to spend on your new materials. If necessary, call AFIADL/ECOC (DSN 596–4153) for detailed guidance.

Organize your revision

We all want our revisions to be as complete and accurate as possible. Take a fresh look at every part of the volume—from the preface to the appendix. Since you are the subject-matter specialist, watch particularly for discrepancies, omissions, and contradictions that creep in when you combine new material with the old.

If you are redoing, say, only three units of a six-unit volume, you must consider the organization, examples, definitions—in fact, the whole point of view—of the previous work.

Prepare your materials

Follow the instructions covered in units 1–5 of this *Guide.* Even though other material in a volume is not being replaced, use the format prescribed in this *Guide* for your new material.

Use existing materials

See appendix C for step-by-step procedures.

6–5. Helping the Institute with Administrative Problems

Although you cannot know all the problems that confront the people who administer your course, there are some ways you can help us. Here are some things you can do to speed up the processing of your course materials and improve the effectiveness of the extension course program.

Sending course charts

When you plan to revise a course or volume, send the course chart through your headquarters to the Institute. The chart tells us what is being revised, what the revision affects, and when we can expect your course. The course chart should:

1. Be complete and accurate.
2. Clearly identify the field "need" date (usually established at a U&TW). This is the date for the course to be ready for students to enroll and get course packages.
3. Give realistic submission dates that reflect the need date.
4. Note whether the volume or course will be used as a specialty knowledge test (SKT) study reference and what test cycle it will support, if known.
5. Specify what course, if any, it will replace.
6. Identify any common volumes (to be used in other courses) and what courses will use them.

Deleting a volume

If you delete a volume, annotate your course control documents. Tell us your plans. The remaining volumes then make up the course, and new forms of the course examination must be developed and issued.

Identifying unchanged material

You may use sizable blocks of material (sections, units, etc.) verbatim from a previous edition of a volume or from a volume in another course. If you do, clearly identify such material in a separate paragraph in your letter of transmittal. Use statements like these:

> Unit 2 of this volume was formerly unit 1 of CDC 1A234 04 0310. Sections 2–2 and 2–5 of this volume were formerly sections 1–1 and 1–4 of CDC 9Z876 03 0309.

Revising unit review exercise items

The unit review exercises are as important as the text. Revise them just as carefully. With each revised volume, send multiple-choice items that cover the material.

Summary

In this unit we have led you through the steps needed to keep your study materials current and correct. You learned that there are three main ways to update and correct: (1) shipping list changes for minor corrections, (2) a change supplement for more substantive changes, and (3) a complete revision when changes are too complicated or extensive to be carried on the shipping list or in a change supplement.

Another important point to remember is to weigh your options carefully in terms of the various strategies discussed earlier in this *Guide*. You may need to employ one strategy for some volumes of a course and an entirely different one for others. *Always consider each volume separately.* Call your Curriculum team and discuss your options with them.

Appendix A. Original Submissions

Sample transmittal letter for a volume

The notes in this sample are for clarification only. Do not repeat them in the document you send to AFIADL.

NOTE: Model your letter on this one, using *only* the sample statements that apply. Modify the format to suit your needs and to convey any other important information about your volume.

NOTE: Use letterhead.

MEMORANDUM FOR AFIADL/ECOC

FROM: CC or other appropriate authority
Street address
Base, state, ZIP + 4

SUBJECT: CDC 3P052A, *Law Enforcement Journeyman,* Volume 2, *Law Enforcement Functions*

1. Course material for this volume was prepared according to the course chart submitted by this group and approved by this center.

2. The CDC writer is TSgt Mary Smith (DSN 000–0000), E-mail address: mary.smith@airbase.af.mil, who has (has not) attended the AFIADL Course for Authors.

3. This volume has (does not contain) lessons from other printed courses/modules. Lessons __ through __ are from CDC ____, volume _, dated ___, lessons __ through __.

4. Forms and publications referenced in this material are current.

NOTE: You can find current and obsolete Air Force forms and publications at http://www.e-publishing.af.mil/.

5. Reference to medical treatment is (is not) in this volume.

NOTE: Make sure any references to medical treatment have been reviewed by an appropriate medical authority.

6. Copyrighted material is (is not) in this volume.

NOTE: If a volume has copyrighted material, enclose a copy of the copyright request and release.

7. For Official Use Only material is (is not) in this volume.

8. No classified information is in this volume.

9. This volume was reviewed and approved according to AFI 33–360, volume 1, and AFI 36–2201.

10. All figures for this volume (except foldout 1) are sent in electronic format. Coordination hard copies are provided.

11. Figures have been cleared through the graphics shop, as necessary.

12. Color graphics are (are not) in this volume.

NOTE: If a volume has color graphics, enclose justification letter.

NAME, Grade, USAF
Duty Title

Attachment:
Checklist for shipping course material

Checklist for shipping course material

The note in this sample is for clarification only. Do not repeat it in the document you send to AFIADL.

NOTE: Mark applicable areas with an "X." Mark nonapplicable areas with "N/A." Write in number of items, when needed.

Course/volume _____ Date _____

Preparing agency _____

Administrative materials

_____ AF Form 74, Communication Status Notice/Request (completely filled in)

_____ Letter of transmittal

_____ Copyright release (copy)

_____ Color justification letter (when color illustrations are needed)

Diskettes

_____ Number of text diskettes

_____ Number of graphics diskettes

_____ Number of CDs

_____ Total number of diskettes and CDs

Files

_____ front.doc

_____ Number of unit files

_____ appen.doc

_____ glos.doc

_____ bib.doc

_____ leg.doc

_____ ack.doc

_____ u0.doc (How many multiple-choice items are included?)

Graphics

_____ Number of figures

_____ Number of foldouts

_____ Number of color illustrations

Course author information

Name/rank _____*(print/type)*

Signature _____ Date _____ DSN _____

E-mail address _____

Author's supervisor _____*(print/type)*

Signature _____ Date _____ DSN _____

Sample request to use copyrighted material

The note in this sample is for clarification only. Do not repeat it in the document you send to AFIADL.

NOTE: Use letterhead.

Name of Company Date
Address

Salutation

We are preparing a work to be published for the Department of Defense for use in training courses. We ask your permission to include in the course this material published by your company, royalty free:

_____

_____

Please indicate below whether the Department of Defense may use this material in training courses (with an appropriate credit line), including computer-based training and training delivered over a secure, password-protected network. The courses containing your material will *not* be placed on sale by the federal government.

Tell us whether you want special wording for the credit line. A self-addressed envelope is enclosed for your convenience.

_____

(Signature and title of requesting government agent)

Yes	No	
___	___	The PERMISSION requested above is hereby granted, royalty free.
___	___	We want the CREDIT LINE to be in a special form and have so indicated in an enclosure to this letter.

_____

(Name of copyright proprietor or authorized agent)

By_____ Date_____

Contents of file ack.doc

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

NOTE: Model your acknowledgment on this one, using only the sample statements that apply.

NOTE: Do not use the acknowledgment to thank your co-workers.

NOTE: When you can cite units or sections of your volume that use specific copyrighted text or figures, do so. If appropriate, use the table function in Word.

NOTE: Adhere to any stipulations set forth in the copyright release. The wording here is only for illustration. Copyright owners often specify required wording.

Acknowledgment **Times New Roman, 16 pt, bold, flush left**

PREPARATION of this volume was aided through the cooperation and courtesy of the Widget Corporation, who furnished technical materials for the new transponder erector. Permission to use this information is gratefully acknowledged. Unit 3 of this volume uses extracts from the Widget Corporation's *Manufacturer's Handbook for Installing Widgets*.

The figures listed here have been reproduced by permission of the Super-Cala Communications Company from *Fragilistic Practices Newsletter (FPN)*:

Date	FPN Figure Title	FPN Figure Number	CDC Figure Number
Aug 97	Even Count PIC Cable	12.3	F3–7
Jun 97	49-Type Cable Terminal	13.9	F3–15
Jan 98	Cable Splicing—General	18.6	F4–8

In accordance with the copyright agreements, distribution of this volume is limited to DOD personnel. The material covered by this permission *may not* be placed on sale by the federal government.

Contents of file u1.doc

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

NOTE: This *abbreviated* unit file demonstrates the headings and general format you will use. To indicate omitted text, we have used "…."

Unit 1. Weapons

THIS UNIT provides the information you need to develop marksmanship proficiency with the GAU–5 rifle and the M9 pistol. It describes the GAU–5, M9, and M–8 (pyrotechnic pistol) and introduces you to the operator maintenance procedures.

NOTE: An introduction for each unit is required.

NOTE: The standard number of spaces after the end punctuation of a sentence is one.

NOTE: The first word or two after the drop cap in the unit introduction use small caps.

1–1. Marksmanship Fundamentals Heading level 2 (Cap each main word.)

The factors that affect a person's ability to fire and hit a target are fairly constant. Essentially, the shooter and the weapon must be in a firing position that forms a single steady unit. You must know how to align your weapon correctly on the target and be able to fire without disturbing the alignment. The skills you need to do these things are *marksmanship fundamentals*.

NOTE: An introduction for each section is required.

001. Rifle marksmanship Heading level 3 (Cap only the first letter of the first word.)

To become a marksman, you must understand thoroughly the fundamentals of marksmanship. Once you develop good shooting habits, periodically refamiliarize yourself with the basic fundamentals and relearn them if you must.

Sight alignment Heading level 4 (Cap only the first letter of the first word.)

Sight alignment, or aiming, is the first fundamental to learn. To learn sight alignment, you must know how to use your shooting eye.

Rapid focus Heading level 5 (Cap only the first letter of the first word.)

It is important to understand that the eye is capable of rapid focus from one distance to another, but it can't be focused at two distances simultaneously. . . .

Front sight **Heading level 6 (Cap only the first letter of the first word.)**

Experience tells us that the best scores come from focusing on the *front* sight. The front sight is clear while the rear sight and target are fuzzy.

Rear sight **Heading level 6 (Cap only the first letter of the first word.)**

Sight alignment is the relationship between the eye and the front and rear sights. Therefore, you gain proper sight alignment by centering the front sight horizontally and vertically in the rear sight.

Sight picture **Heading level 5 (Cap only the first letter of the first word.)**

Sight picture differs from *sight alignment*. For sight picture, you add the target (aiming point) to the front sight blade.

Breath control **Heading level 4 (Cap only the first letter of the first word.)**

Breath control is important to the aiming process. If you breathe while you're aiming, the rise and fall of your chest causes the weapon to move up and down. Since breathing disturbs the aiming process, you must know when and how to hold your breath. . . .

Trigger squeeze **Heading level 4 (Cap only the first letter of the first word.)**

Trigger squeeze is the act of pulling the trigger straight to the rear until the hammer falls. Pulling straight to the rear keeps you from disturbing the sight alignment, which is what happens if you apply side pressure on the trigger.

Trigger control **Heading level 4 (Cap only the first letter of the first word.)**

Trigger control is the most important fundamental of shooting. It's the independent action of the forefinger on the trigger, with a uniformly increasing pressure *straight* to the rear until the rifle fires. . . .

002. Handgun marksmanship **Heading level 3 (Cap only the first letter of the first word.)**

The important elements of handgun marksmanship are:

- Aiming.
- Position.
- Trigger squeeze.
- Trigger control.
- Follow-through.

NOTE: Use bullets button on custom toolbar. Cap first letter of the first word. Bullets are used here instead of numbers because this is not a simple list—the bullets emphasize and announce topics to be discussed in the lesson.

Trigger control **Heading level 4 (Cap only the first letter of the first word.)**

Trigger control (fig. 1–1) allows you to fire your handgun without disturbing your aim and is one of the most important fundamentals of shooting. . . .

NOTE: Blank line above legend should be Body Text style.

Figure 1–1. Trigger control. Use Legend style. (Cap only the first letter of the first word.)

003. Firing in unusual conditions Heading level 3 (Cap only the first letter of the first word.)

Marksmanship fundamentals apply to all firing situations. You must practice and be proficient with them before you try to adapt these procedures to less than ideal situations. . . .

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

NOTE: To insert the STQ border, title, and instructions, click on the AutoText button on the custom toolbar.

001. Rifle marksmanship STQLO style

1. Name the fundamentals of good marksmanship. **STQs style**

2. What is the difference between trigger control and trigger squeeze? **STQs style**

. . . .

Answers to Self-Test Questions

NOTE: To insert the answers border and title, click on the AutoText button on the custom toolbar.

001 STQLO style. No period after the number

1. Sight alignment, breath control, trigger squeeze, and trigger control. **Answers style**
2. Etc. **Answers style**

. . . .

NOTE: Answers to matching exercises should be formatted like this:

004 STQLO style. No period after the number

1. (1) e. **Answers style**
   (2) a. **Subordinate Answer style**
   (3) c.
   (4) b.
   (5) d.

Contents of file appen.doc

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

NOTE: If you have more than one appendix, you may use this format for a title page:

Appendixes **Times New Roman, 16 pt, bold, flush left**

Appendix A. RS Insulation

Appendix B. RV Insulation

Appendix C. PS Spacer

Appendix D. G&C, MGS, PSRE Insulation

NOTE: Appendix materials follow.

NOTE: If you have only one appendix, you may use this heading:

Appendix **Times New Roman, 16 pt, bold, flush left**

NOTE: Appendix materials follow.

NOTE: You may use this heading with or without a listing of subtopics.

Contents of file glos.doc

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

Glossary **Times New Roman, 16 pt, bold, flush left (no need to apply heading level).**

Terms **Times New Roman, 14 pt, bold, flush left**

NOTE: Capitalize each entry as it is supposed to be in the text. Capitalize the first letter of the first word in the meaning.

NOTE: Make sure entries are in alphabetical order.

antisidetone circuit—A telephone circuit that materially reduces sidetone without reducing the output of the telephone; without sidetone.

artificial line—Network that simulates the electrical characteristics of a transmission line.

attenuation—The decrease in amplitude of electrical energy as it passes through a device or a circuit.

Abbreviations and Acronyms **Times New Roman, 14 pt, bold, flush left**

NOTE: Capitalize each entry as it is supposed to be in the text. Each word in the spelled-out term is written lowercase unless the word is a proper noun.

NOTE: Use the table function in Word to develop glossaries of abbreviations and acronyms.

NOTE: Make sure entries in left-hand column are in alphabetical order.

AS&I	assembly, surveillance, and inspection
AVE	aerospace vehicle equipment
CBU	cluster bomb unit
CINC	commander in chief
DOD	Department of Defense
ECS	environmental control system
IEEE	Institute of Electrical and Electronics Engineers
MAJCOM	major command
MHz	megahertz
MOU	memorandum of understanding
NCA	National Command Authorities
psi	pounds per square inch
RS	reentry system

Contents of file bib.doc

The note in this sample is for clarification only. Do not repeat it in the file you send to AFIADL.

NOTE: Most AFIADL courses do not need bibliographies. *Do not send one unless you want your students to consult the sources listed or a copyright release requires one.* Do not include Air Force publications.

Bibliography **Times New Roman, 16 pt, bold, flush left**

Books **Times New Roman, 14 pt, bold, flush left**

Ruban, Melvin R. *Fundamentals of Corrosion Prevention.* St. Louis, Missouri: The C. T. Mosley Company, 1987.

Commercial Manuals **Times New Roman, 14 pt, bold, flush left**

Measuring Tools. Davenport, Iowa: Keystone Company, 1988.

Contents of file leg.doc

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

Copy for Legends for Test Item Figures

NOTE: Number each figure you submit for use with multiple-choice test items as T–?, as shown below. When AFIADL develops the URE for the volume, the figures will be inserted into the unit files as near the related URE item as possible. During final layout, the editor will renumber the figure legends so that they will be in consecutive sequence with the other figure numbers in the unit. If any of these figures are used on a course examination, the ISS will renumber them appropriately.

Figure T–1. Test item 612–5. [ft–01.jpg]

Figure T–2. Test item 613–2. [ft–02.jpg]

Copy for Legends for Appendixes

NOTE: Use alpha designators (A, B, C, etc.) for appendixes.

NOTE: If you send appendix figures, submit the legend copy like this so that we can identify exactly where to place each appendix figure:

Appendix A. Aerospace Vehicle Insulation Inspection [fa–01.jpg] [fa–02.jpg]

Appendix B. LGM30G AVE Removal and Replacement [fa–03.jpg] [fa–04.jpg]

Appendix C. Missile Carriages [fa–05.jpg]

Copy for Legends for Foldouts

Foldout 1. Wiring diagram.

Foldout 2. Wiring diagram (contd).

Foldout 3. Electrical symbols. (Reproduced by permission of the Super-Cala Corporation.)

Contents of file u0.doc

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

NOTE: Turn OFF the automatic numbering feature in Word before you type any options.

NOTE: Type one space after the letter and period at the beginning of each option.

NOTE: Type a period at the end of each option.

1B256–01
topicid001.
beginitem ans=b import=i endid
To ensure proper sight alignment, the shooter should concentrate on
a. breath control.
b. the front sight.
c. trigger squeeze.
d. the rear sight.
enditem

beginitem ans=c endid
The act of pulling the trigger straight to the rear until the hammer falls is called
a. trigger control.
b. sight alignment.
c. trigger squeeze.
d. breath control.
enditem

[[[use next item on CE
beginitem ans=b import=c endid
What is the *most* important fundamental of shooting?
a. Trigger squeeze.
b. Trigger control.
c. Sight alignment.
d. Breath control.
enditem

topicid002.
beginitem ans=d import=c endid
The *most* important time to have perfect sight alignment is
a. during breath control.
b. just before pulling the trigger.
c. when you apply trigger squeeze.
d. while the bullet is traveling through the barrel.
enditem

AFIADL graphics requirements

File format and name conventions

File format: All graphics *must be* in the **JPG** file format

Use dual numbers for file names — for instance, if the graphic is figure 1–1, the file name should be F1-01.JPG. File names should not have any spaces.

Size and resolution, color and layers

Maximum ORIGINAL and PRINTED/FINISHED size: 6 × 9 inches at a minimum of 150 dpi
Look at your graphics in a size no larger than 6 × 9 inches so that you can correct too large and too small text.

ICONS maximum 1 x 1 inch FINISHED size

Create in GRAYSCALE not RGB/CMYK

— With *permission* for COLOR, create in **RGB Format**

Layers:

- — **DO NOT USE TRANSPARENT LAYERS** in finished product for printing.
- — If layers are used in creating graphic, ***finished product must have ALL LAYERS FLATTENED***.

Miscellaneous

No color graphics, unless they are to be printed in color (justification required).

All graphics will be inserted into portrait-oriented pages. If a graphic is to appear in landscape orientation (sideways) in a CDC, it must be rotated 90 degrees counterclockwise (this should make the head of the graphic on the left side of the file).

Graphics identification numbers should be as small as practicable and at the bottom of the graphic. Make the text of the number just large enough to be legible.

Allow ¼-inch white space of margin — too much or no white space makes working the page layout difficult.

Do not draw a box around the graphic.

Provide a hard copy of each graphic: — "File copy" printed over graphic is unacceptable.
— One figure per page.

Do *not* send us graphics with transparent backgrounds. Send us graphics with *white* backgrounds.

Questions?

AFIADL'S graphic points of contact:

For questions regarding educational aspects: Comm: (334) 416-4177 DSN: 596-4177

For questions regarding technical aspects: Comm: (334) 416-6174/4163 DSN: 596-6174/4163

email mailto:AFIADL/graphics@maxwell.af.mil

Appendix B. Supplemental Submissions

Format for replacement or new multiple-choice items

The notes in this sample are for clarification only. Do not repeat them in the file you send to AFIADL.

NOTE: Turn OFF the automatic numbering feature in Word before you type any options.

NOTE: Type one space after the letter and period at the beginning of each option.

NOTE: Type a period at the end of each option.

topicid001.
beginitem ans=b endid
To ensure proper sight alignment, the shooter should concentrate on
a. breath control.
b. the front sight.
c. trigger squeeze.
d. the rear sight.
enditem

beginitem ans=c endid
The act of pulling the trigger straight to the rear until the hammer falls is called
a. trigger control.
b. sight alignment.
c. trigger squeeze.
d. breath control.
enditem

topicid002.
beginitem ans=c endid
Sight misalignment due to sideward pressure on the trigger is caused by faulty
a. sight picture.
b. breath control.
c. trigger squeeze.
d. hand and eye coordination.
enditem

beginitem ans=d endid
Which of these *best* describes handgun trigger control?
a. Pull the trigger straight to the rear until the hammer falls.
b. Time your shots to finish the course of fire in the allotted time.
c. Hold your wrist and elbow locked and concentrate on the front sight until the weapon fires.
d. Moving only your forefinger, uniformly increase pressure on the trigger straight to the rear until the weapon fires.
enditem

Format for URE and CE changes

The notes in this sample are for clarification only. Do not repeat them in your submittal to AFIADL.

NOTE: If the course you are supplementing is in the field under its old number, refer to it here by its old number.

NOTE: Use the table function in Word to format your changes.

NOTE: If the errata or supplement does not cause changes to URE or CE items, please say, "No URE or CE changes."

NOTE: Double-space after each entry in the Correction column.

NOTE: Send E-mail or hard copy, *not* a disk.

NOTE: When you submit errata by E-mail, place all information for the course in one attachment (*not* CE.doc, Vol 1.doc, URE.doc, etc.).

NOTE: When you submit errata, *do not include any previously submitted errata.*

NOTE: When you submit errata for two or more separate courses at the same time, begin the errata for each course on a new page. This rule applies whether you are submitting hard copy or E-mail.

Changes for URE 3E951–03–0312, edit code 01

Page	Item Number	TS Number	Correction
2–3	9	406	In the stem of the question, change "soldier." to "solder."
3–6	13	409	In option b. change "powder" to "power" In option d. change "on" to "off"
6–9	53	442	Delete.

Changes for CE 3E951–900–01

Page	Item Number	Correction
10	65	Delete.
12	75	Rekey from "d" to "c"

Your options for submitting CE changes

Your options are to rekey an answer, delete a question, or make a minor pen-and-ink change.

Acceptable changes:

1. Correcting misspelled words.
2. Correcting symbols that did not print.
3. Rekeying answers.
4. Adding missing words, such as “will” before “be.”
5. Deleting items.

Unacceptable changes:

1. Rearranging options or stems.
2. Rewording stem or options, adding explanatory phrases, spelling out acronyms.
3. Reinserting an item previously deleted.
4. Deleting only part of an item.
5. Replacing an item in its entirety.

NOTE: Verify course number, exam number, and edit code before submitting.

NOTE: If you have fewer than 10 deletions on your exam, they may not show up on the student’s copy as having been deleted. If you have ten or more deletions on your exam, they will be marked on the exam.

Format for changes for the text

The notes in this sample are for clarification only. Do not repeat them in your submittal to AFIADL.

NOTE: Use the table function in Word to format your changes.

NOTE: Send E-mail or hard copy, *not* a disk.

NOTE: When you submit errata by E-mail, place all information for the course in one attachment (*not* CE.doc, Vol 1.doc, URE.doc, etc.).

NOTE: When you submit errata, *do not include any previously submitted errata.*

NOTE: When you submit errata for two or more separate courses at the same time, begin the errata for each course on a new page. This rule applies whether you are submitting hard copy or E-mail.

CDC 2S051–02–01

Changes for the Text: Volume 1

General Note : Throughout the volume, change "you should get authorization" to "you must get authorization."

Pen-and-Ink Changes:

Page	*Subject*	*Line(s)*	*Correction*
2–4		26–29	Change "You can keep . . . parts, place them" to "Place the leftover parts"
2–7	017–10		Delete.
2–13		3 & 4 fr bot	Change "in a reasonable time (72 hours)." to "at once."
2–17		20–25	Change all references to "Vehicle Authorization and Utilization Board (VAUB)" to "Logistics Group Commander or equivalent"
2–21	025–3		Delete.
2–24	025–3		Delete.
3–5		19	Change "58" to "25"
		21	Change "$117" to "$122"
3–24	033–16		Delete "and d"

Page Changes:

Remove:	*Insert:*
i — ii	i — iii
	5–1 — 5–62

Sample letter of transmittal for a supplement

The notes in this sample are for clarification only. Do not repeat them in the document you send to AFIADL.

NOTE: If the course you are supplementing is in the field under its old number, refer to it here by its old number.

NOTE: Select the appropriate statements. Include other attachments as required. Modify this format to suit your needs and to convey other important information on your materials.

NOTE: Use letterhead.

MEMORANDUM FOR AFIADL/ECOC

FROM: CC or other appropriate authority
Street address
Base, state, ZIP + 4

SUBJECT: Change Supplement for CDC 29570, *Automatic Digital Switching Technician,* Volumes 1, 2, and 3

1. This change supplement is being sent to you as directed for publication.

2. The CDC writer is TSgt John Smith (DSN 000–0000), E-mail address: john.smith@airbase.af.mil.

3. Forms and publications referenced in this material are current.

4. There is (is no) reference to medical treatment in this material.

NOTE: If material has reference to medical treatment, verify that the material has been reviewed by an appropriate medical authority.

5. There is (is no) copyrighted material in this supplement.

NOTE: If a supplement has copyrighted material, enclose a copy of the copyright request and release. If the copyright release is new, also send ACK.DOC file. If a bibliography is needed, send BIB.DOC file.

6. There is (is no) For Official Use Only material in these volumes.

7. No classified information is contained in these volumes.

8. All figures (except foldouts and figure 1–5, which is a photograph) are sent in electronic format. Coordination hard copies are provided.

9. Figures have been cleared through the graphics shop, as necessary.

10. This supplement affects UREs 29570–01–01, 29570–02–01, 29570–03–01, and CEs 29570–900–35 and –36. *or* This supplement does *not* affect UREs 29570–01–01, 29570–02–01, 29570–03–01, or CEs 29570–900–01 and –02. (By "affect" we mean that the supplement deletes or changes text on which UREs and CEs are based and that deletions or minor changes are required in the URE or CE.)

NAME, Grade, USAF
Duty Title

Attachment:
Checklist for shipping supplemental material

Checklist for shipping supplements

The note in this sample is for clarification only. Do not repeat it in the document you send to AFIADL.

NOTE: Mark applicable areas with an "X." Mark nonapplicable areas with "N/A." Write in the number of items, when needed.

Course/volume _____Date _____

Preparing agency _____

Administrative materials

_____ AF Form 74, Communication Status Notice/Request (completely filled in)
_____ Letter of transmittal
_____ Copyright release (copy)
_____ AETC Form 469, Career Development Course Chart (Part 1) (if not previously sent)

Diskettes

_____ Number of text diskettes
_____ Number of graphics diskettes
_____ Number of CDs
_____ Total number of diskettes and CDs

Files

_____ p&i.doc (include changes to existing URE items)
_____ insert.doc
_____ leg.doc
_____ readme.doc (How many new multiple-choice items are included?)

Graphics

_____ Number of replacement/additional figures

Hard copies

_____ Coordination hard copies of graphics
_____ Foldout replacements/additions
_____ Marked volumes

Other

_____ (Identify)

Course author information

Name/rank _____*(print/type)*

Signature _____ Date _____ DSN _____

E-mail address _____

Author's supervisor _____*(print/type)*

Signature _____ Date _____ DSN _____

Author's Procedures for Developing a Change Supplement

1. These instructions are to be used along with the instructions stated in the *Guide for Authors,* Sixteenth Edition.
2. When you coordinate with your team lead and decide that a change supplement will be the strategy you use, request printed and electronic copies of your course. You may or may not be able to obtain a current electronic version.
3. You will need to go to the templates to generate new files for the following:

Pen-and-Ink Changes

a) Use current **00P&I** template to do pen-and-ink changes. If you have pen-and-ink changes that occur more than ten times in a volume, do a general note.

b) Check all pen-and-ink changes for accuracy, continuity with existing text, conciseness, and correct page, subject, and line count.

c) When you are combining supplements, check the old pen-and-ink changes against the new ones. (**NOTE**: New changes can alter or invalidate earlier ones.)

d) Incorporate in the volume or volumes being supplemented any text changes you find in the previous shipping list.

e) Check whether changes in the text require changes in the preface, table of contents, or unit menu pages. (**NOTE**: Such changes are required most often when units are added or deleted.)

f) Prepare an accurate listing of replacement or additional pages at the end of the pen-and-ink section under Page Changes.

g) Check whether UREs and CEs are affected by changes. Put *only* URE text changes in the supplement. *Do not* put URE rekeys, deletions, or CE deletions, changes, or rekeys in the supplement.

h) Review all materials to make sure you did everything and did it right.

Author's Change Supplement Coordination Review Checklist	
Supplement Number:	**Edit Code:**
Suspense:	
Circumstances:	

	Combined supplements; checked old pen-and-ink changes against the new ones.
	If materials were previously deleted, made sure the pen-and-ink section does not contain corrections to the deleted materials.
	Made sure shipping list incorporates any text changes to the volume or volumes being supplemented.
	Checked pen-and-ink changes for accuracy, continuity with existing text, conciseness, and correct page, subject, and line count.
	Checked pen-and-ink entries against replacement pages to make sure there are no pen-and-ink changes for those pages. (Incorporated the P&I changes in the replacement pages.)
	Assured continuity from the original text to the replacement page(s) and back again.
	Prepared an accurate listing of replacement or additional pages at the end of the pen-and-ink section.
	Changed preface, table of contents, or unit menu pages if changes in the text affected them.
	Made sure lessons are properly numbered. Kept the numbering consistent with the original text. (Used a, b, c lessons and pages if necessary.)
	Made sure all STQ have answers. Incorporated new answers into the old answers at the proper places through page replacement or pen-and-ink changes.
	Checked the impact on URE and CE items based on text changes: additions, deletions, rekeys, and minor pen-and-ink changes.
	Made sure new page numbers correlate with old page numbers from the original text. (For example, made sure odd and even pages are still in sequence.)
	Carefully double-checked all materials, including new and existing changes, pertinent to this supplement.

Supervisor's Signature and Title	Date
Author's Signature and Rank	Date

Appendix C. Revising by Reusing Existing Materials

Introduction

This method is the standard way to revise course materials. Generally, the concept behind it is that you identify what you change and we review only the changes.

What we'll cover

This appendix takes you step-by-step through the revision process. Specifically, these instructions tell you how to revise by combining archives with new material.

Keep existing course current

- Post shipping list changes, supplements, etc.
- Keep up with changes in your career field and note how they affect your course.
- Keep informed of any publication or similar changes that affect your course.
- Identify and get new or updated information to use to revise your course.

Make a plan

- Review the STS against the printed course.
- Decide what material can remain and what you must delete.
- Identify STS elements that require you to add new material.
- Identify sources you can use to write new material.
- Identify graphics requirements and get the graphics shop working.
- Make sure you have an archived disk copy of your course.
- Know what you must write yourself.

"Master" your graphics

- Identify any new graphics and give the requirements to your graphics shop.
- Identify graphics you can reuse from the current course. Once you've identified them, get digitized copies:
- If you have a digitized graphic on hand, copy it onto a new disk for this project. This becomes the graphics disk (one of several) you will send with the completed project.
- If you do not have a digitized copy of a graphic, see whether the graphics shop has one. If so, ask for a new disk and coordination hard copy.
- If your graphics are in a format other than GIF, JPEG, or EPS, get the graphics shop to convert them.
- Make sure the graphics files are named properly and the coordination hard copies are marked with the same file name.
- If you need graphics from other CDCs:
  - Ask the CDC writer to send you a disk copy.
  - If that is not possible, ask your graphics shop to create a new graphics file for you from the hard copy in the volume where you saw the graphic).
- When you send graphics with revised course material:
  - Send a graphics file on disk and a coordination (printed) copy of each graphic.
  - Identify each graphic by figure number.

Step-by-step procedures

Step	Action
1	• Use the archived word processing files on the disk that you received at coordination time on the existing course. • Get two sets of your most recent printed course (issued with last revision).
2	Assemble your "raw" materials: • Printed copy you've marked to show deletions and additions (your up-to-date file copy). • Materials you've assembled to support new text you will develop. • Word processing files. • New text you've prepared. • Clean copy of printed version of volume you are revising.

3	Use the clean printed copy to prepare your "road map":
	• × out all deleted material (text, graphics, self-test questions, answers to self-test questions, and UREs).
	• Write in corrections of less than a paragraph where they occur.
	• Where you need to replace material (paragraph length or longer including both text and graphics):
	  • Make an × over the material.
	  • Write "Replace" in the margin next to the material.
	• Where you need to insert new material (text and graphics):
	  • Write the word "Insert" in the margin.
	  • Draw an arrow to the location for the insert.
	• Indicate moves as necessary
	  • Renumber lessons as appropriate.
	  • Note lesson moves from one section or unit to another.
	  • Renumber units as appropriate.
	  • Correct spelling and printing/typographical errors.

4	Update your word processing files: • Check currency and consistency of regulations, manuals, instructions, forms, AFTO names, and acronyms. • Follow the road map you made in the printed text. • Decide the order in which you make your changes. • Delete materials as appropriate. • Move materials as appropriate. • Insert and merge new paragraph length or longer material as appropriate. • Place [[[New Material on a separate line at beginning. • Place [[[End New Material on separate line at end. • Indicate graphics placement by putting the legend on a separate line following the paragraph where you make first reference to the figure.

Step	Action

5	Revise your test item bank:
	• Delete test items related to deleted text from the U0.doc file.
	• Review items related to reused text for accuracy.
	  • Change terminology if appropriate.
	  • Correct any spelling or typographical errors.
	  • Validate the correct answer.
	• Prepare and insert new items for:
	  • New material added to a lesson.
	  • New lessons added to a unit.
	  • New units added to the volume.
	• Indicate text support in your word processing file.

6	Assemble your package:
	• Create a new front.doc file using the appropriate template.
	• Check for:
	  • Revised unit menu pages.
	  • Hard copy of graphics.
	  • Misspellings (run spell check program).
	  • Inclusion of all changes from your marked road map.
	Assemble your files:
	  • Front.doc
	  • Unit.doc files
	  • Trailing matter files (appendixes, glossary, bibliography)
	  • U0.doc (test item bank)
	  • Graphics files (one for each graphic used)
	Assemble your package:
	  • Letter of transmittal
	  • Graphics hard copies
	  • Disks with files
	  • Marked-up book (your road map).

7	Mail your package to the Institute: AFIADL/ECOC 50 South Turner Boulevard Maxwell AFB, Gunter Annex AL 36118–5643

Notes

Glossary of Abbreviations and Acronyms

ACE	American Council on Education
ADL	advanced distributed learning
AETC	Air Education and Training Command
AFDLO	Air Force Distance Learning Office
AFH	Air Force handbook
AFI	Air Force instruction
AFIADL	Air Force Institute for Advanced Distributed Learning
AFSC	Air Force specialty code
AFTO	Air Force technical order
ASCII	American Standard Code for Information Interchange
AU	Air University
BITS	Base Information Transfer System
CADRE	College of Aerospace Doctrine, Research, and Education
CBI	computer-based instruction
CD	compact disk
CDC	career development course
CD-ROM	compact disk–read-only memory
CDSAR	Course Development and Student Administration/Registrar
CE	course examination
COMPUSEC	computer security
COMSEC	communications security
CTS	course training standard
DAPS	Defense Automated Printing Service
DETC	Distance Education and Training Council
DOC	document
DOD	Department of Defense
Dpi	dots per inch
DSN	Defense Switched Network
ECI	Extension Course Institute
EPS	Encapsulated PostScript
fig.	figure
FO	foldout

FOUO	For Official Use Only
GIF	Graphics Interchange Format
IMI	interactive multimedia instruction
ISD	instructional systems development
ISS	instructional systems specialist
IT	instructional technology
JP	joint pub
JPEG	Joint Photographic Experts Group
LAN	local area network
Mm	millimeter
OAS	Office of Academic Support
OJT	on-the-job training
OPR	office of primary responsibility
OPSEC	operations security
PCX	Paint bitmap graphic (file name extension)
PME	professional military education
PPT	PowerPoint Presentation (file name extension)
SC	specialized course
SIS-PME	Single Input System for Officer Professional Military Education
SKT	specialty knowledge test
STQ	self-test question
STS	specialty training standard
SVO	subject-verb-object
TIFF	tagged image file format
TO	technical order
U&TW	Utilization And Training Workshop
UPS	United Parcel Service
URE	unit review exercise
USC	United States Code
WAPS	Weighted Airman Promotion System
WMF	Windows Metafile Format

Index

Author Survey

This 16th edition of the *Guide for Authors* gets to the bare bones of the authoring process. Its organization should be easy for you to follow—if it is not, let us know.

1. Are our instructions clear?

2. Can you find the information you need where you think it should be?

3. Is guidance on procedures complete?

4. What other examples would you like to find in the appendixes?

5. How do you like the page layout?

6. What other topics should we cover?

7. Do you have *any* suggestions to improve the *Guide?*

This form is self-addressed to AFIADL/ECB. Please fold and staple it. Then add your name and return address and drop it in pouch mail.

(fold here)

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POUCH

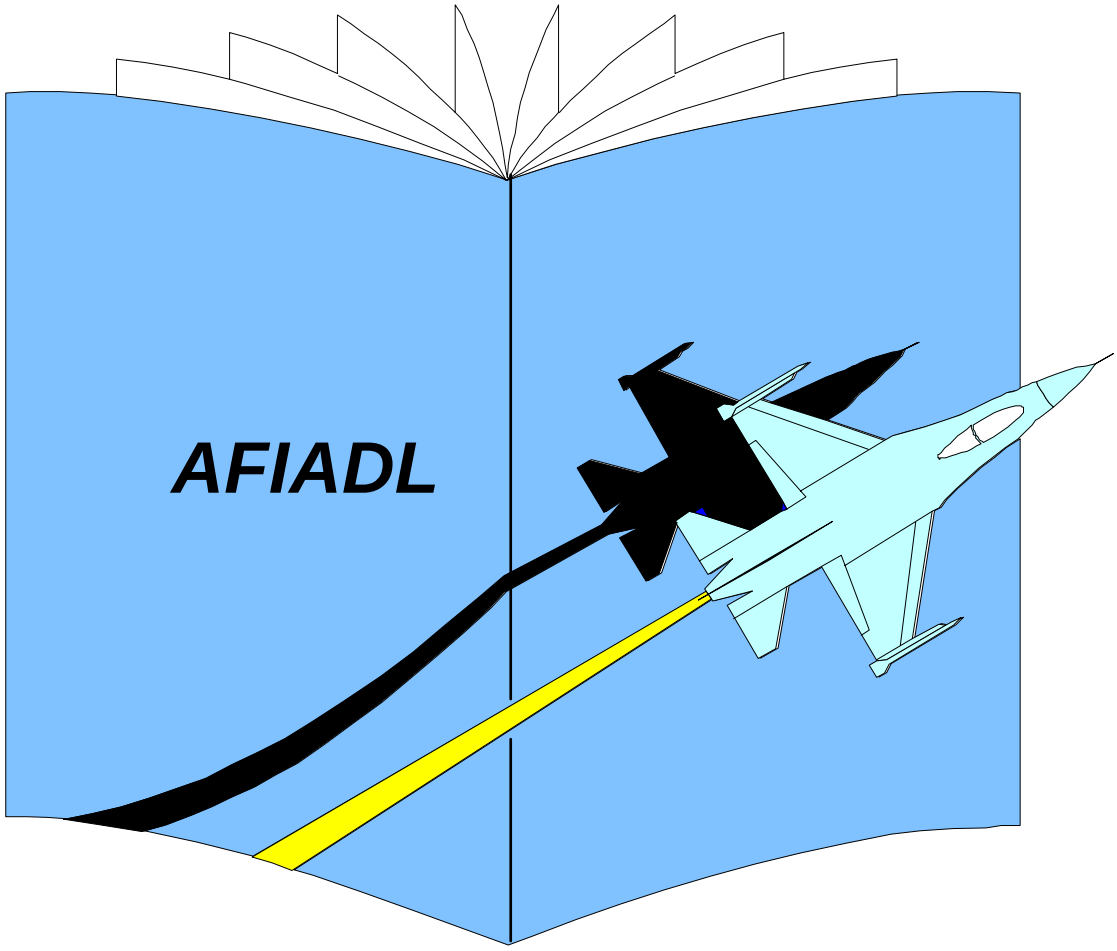
AFIADL/ECB
50 South Turner Boulevard
Maxwell AFB, Gunter Annex AL 36118–5643

(fold here)

AFIADL Curriculum Teams and Air Force Career Fields

Course Development Branch A (ECA) Branch Chief DSN 596–4420 Comm (334) 416–4420	
Team 1 (ECA-1) Team Lead DSN 596–4187	2A – Manned Aerospace Maintenance 2F – Fuels 2G – Logistics Plans 2P – Precision Measurement 2R – Maintenance Management Systems 2T – Transportation & Vehicle Maintenance CAP
Team 2 (ECA-2) Team Lead DSN 596–4209	2M – Missile & Space Systems Maintenance 2S – Supply 4X – Medical 5J – Paralegal 5R – Chaplain Service Support 6C – Contracting 6F – Financial AFIT
Team 5 (ECA-5, Blended Learning) Team Lead DSN 596-2001	Interactive courseware or multimedia enhancements to CDCs or specialized courses.
Course Development Branch B (ECB) Branch Chief DSN 596–4242 Comm (334) 416–4242	
Team 3 (ECB-3) Team Lead DSN 596–4317	1A – Aircrew Operations 1C – Command Control Systems Operations 1N – Intelligence 1S – Safety 1T – Aircrew Protection 1W – Weather 2W – Munitions & Weapons 3C – Communications–Computer Systems 3N – Public Affairs 3P – Security Police 3R – Printing Management 3V – Visual Information
Team 4 (ECB-4) Team Lead DSN 596–4897	2E – Communications–Electronics Systems 3A – Information Management 3E – Civil Engineering 3H – Historian 3M – Morale, Welfare, Recreation & Services 3S – Mission Support 3U – Manpower

Fax: DSN 596–3208 Comm (334) 416–3208



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